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Draft Final Report

THEORETICAL ANALYSIS OF DIPOLE ANTENNA CHARACTERISTICS ON THE RAE SATELLITE

Part 2
TCI No. 2236

Contract NAS5-11256

Prepared for

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July 1970

APPENDIX B

PRINCIPAL-PLANE RADIATION PATTERNS FOR DIPOLE IN PRESENCE OF V-ANTENNAS AND LIBRATION DAMPER

The patterns presented in this Appendix are found, in general, in groups of six, representing the three principal planes and the two excitation modes. Within each such group, all patterns have been normalized to the same value. Absence of one or more members of a group indicates that no features were visible in that plane and mode on the scale used. Maximum and minimum dB values on each plot indicate the range of gain represented by the scales. One scale division in all cases represents 5 dB.

The patterns have been stamped as being of either theta or phi polarization. These designations refer to a spherical coordinate system whose axis coincides in the conventional way with the Z-axis. Theta polarization means an electric vector parallel to a meridian of longitude, and phi means that the electric vector lies along a parallel of latitude.

NOTE: B-1 through B-100 are for the long V

B-101 through B-195 are for the short V

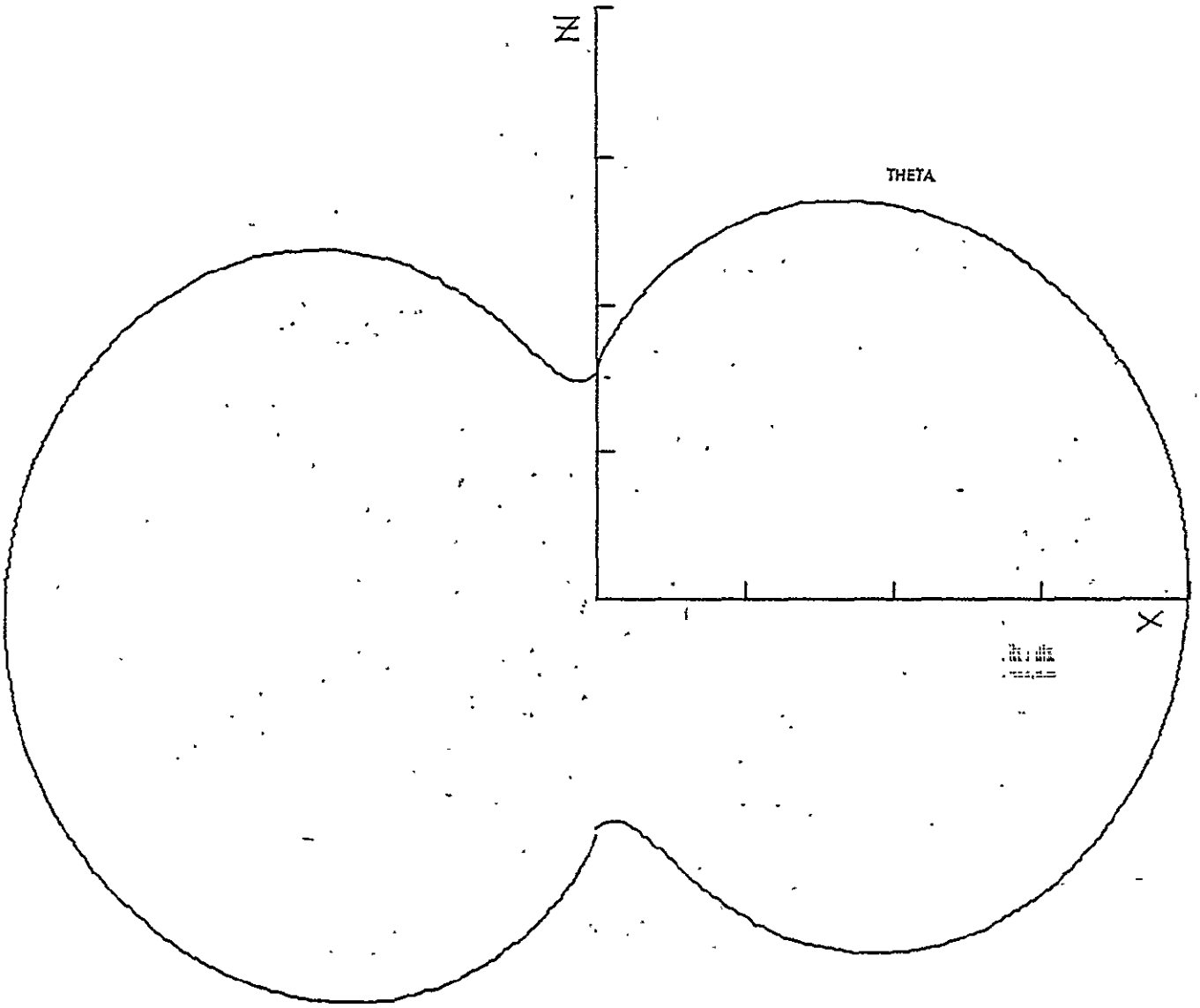

FIGURE B-1

FREQUENCY (MHZ) .202
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX -21.3
DB MIN -41.3

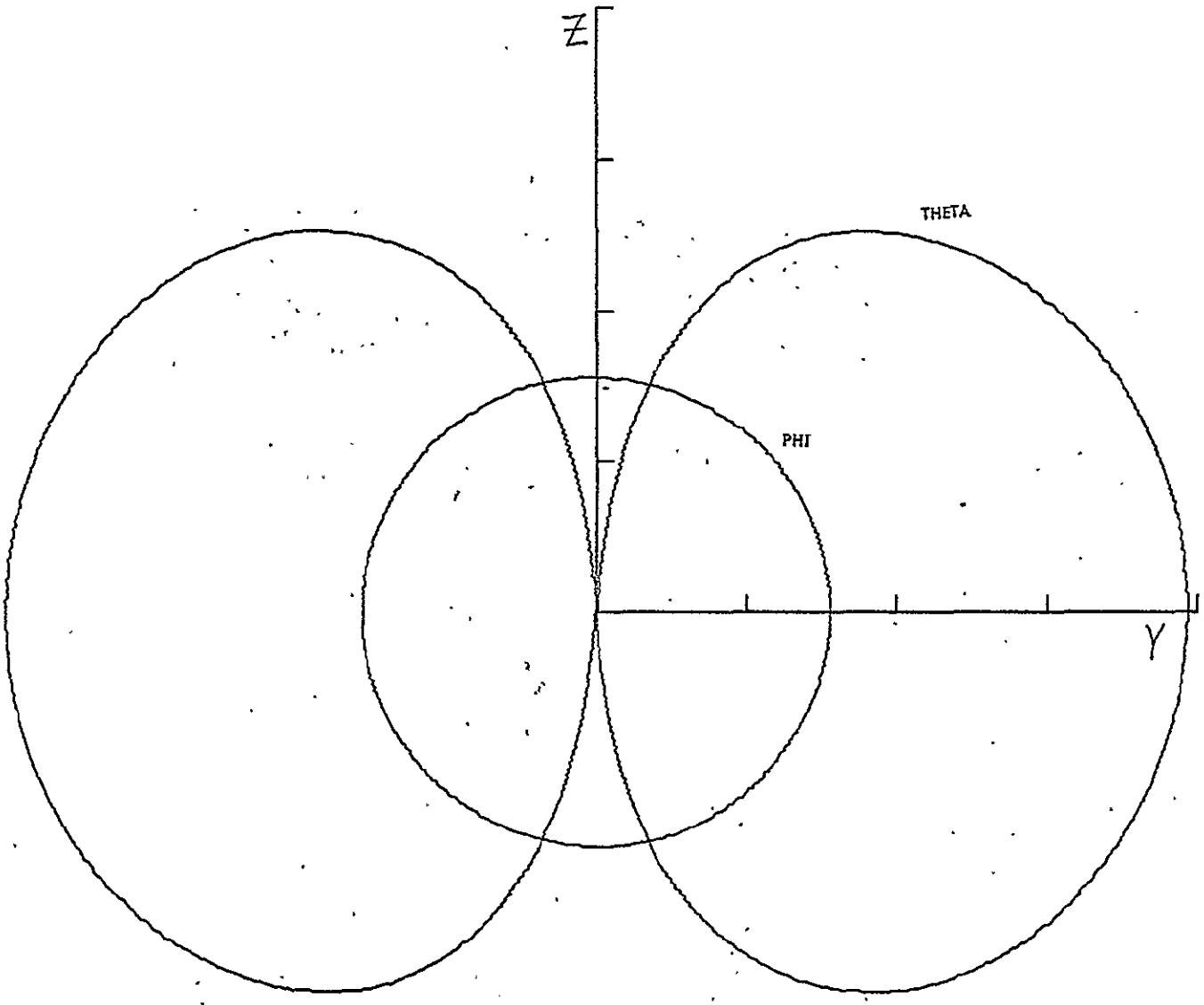

FIGURE B - 2

FREQUENCY (MHZ) .202
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX -21.3
DB MIN -41.3

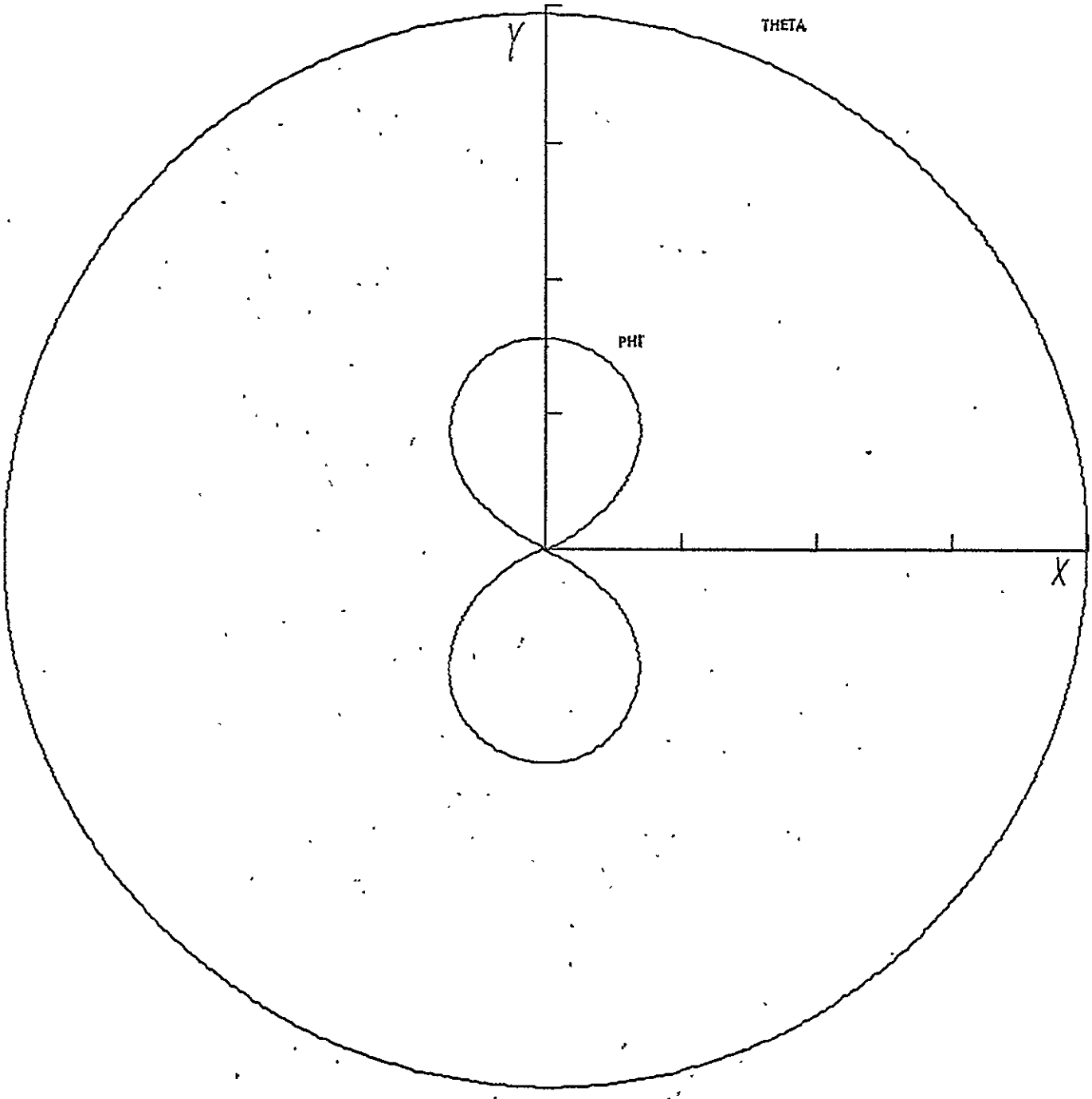

FIGURE B - 3

FREQUENCY (MHZ) .202
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX -21.3
DB MIN -41.3

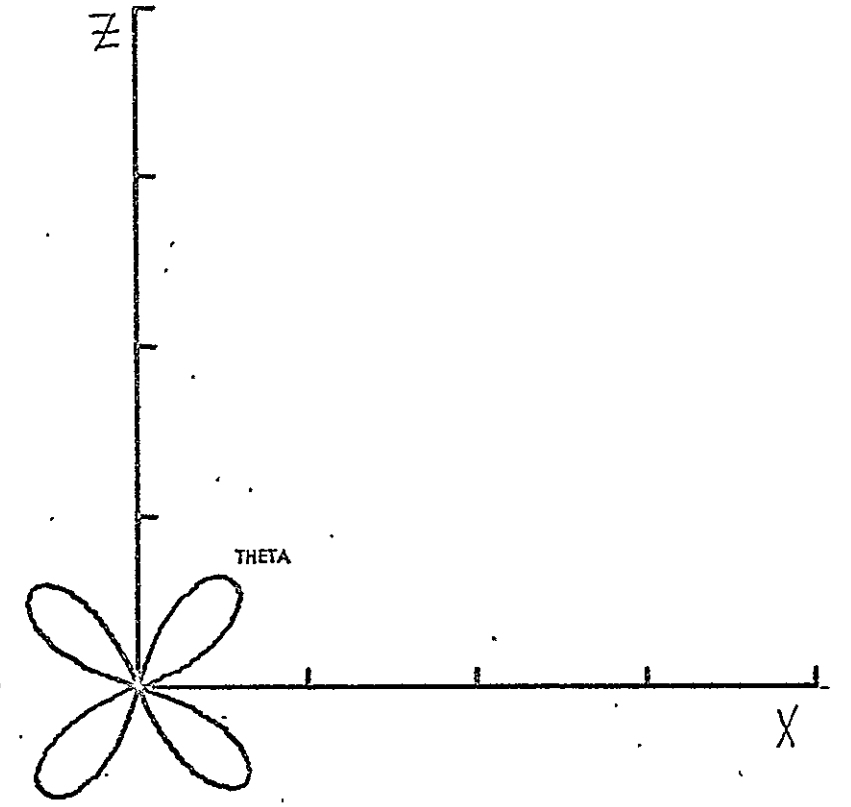

FIGURE B - 4

FREQUENCY (MHZ) .202
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX -21.3
DB MIN -41.3

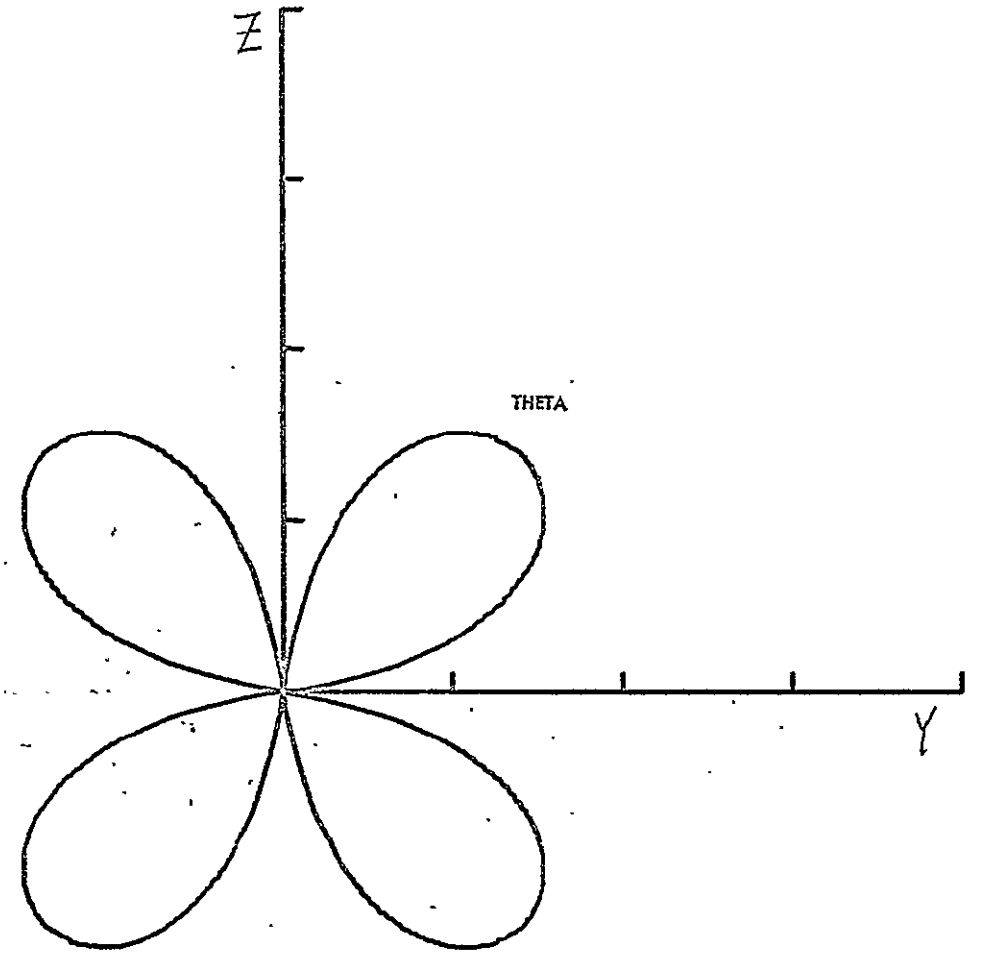

FIGURE B - 5

FREQUENCY (MHZ) .202
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX -21.3
DB MIN -41.3

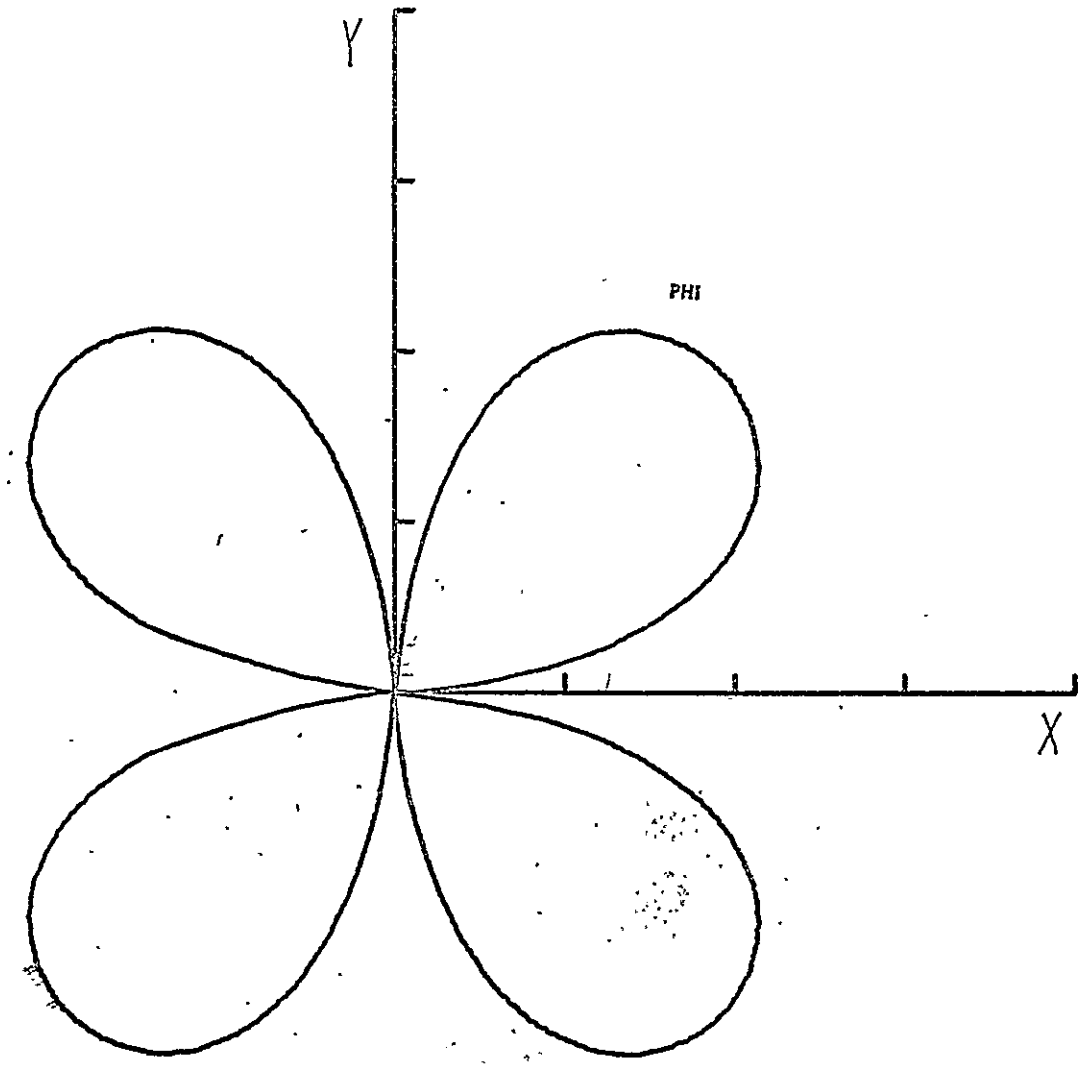

FIGURE B - 6

FREQUENCY (MHZ) 202
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX -21.3
DB MIN -41.3

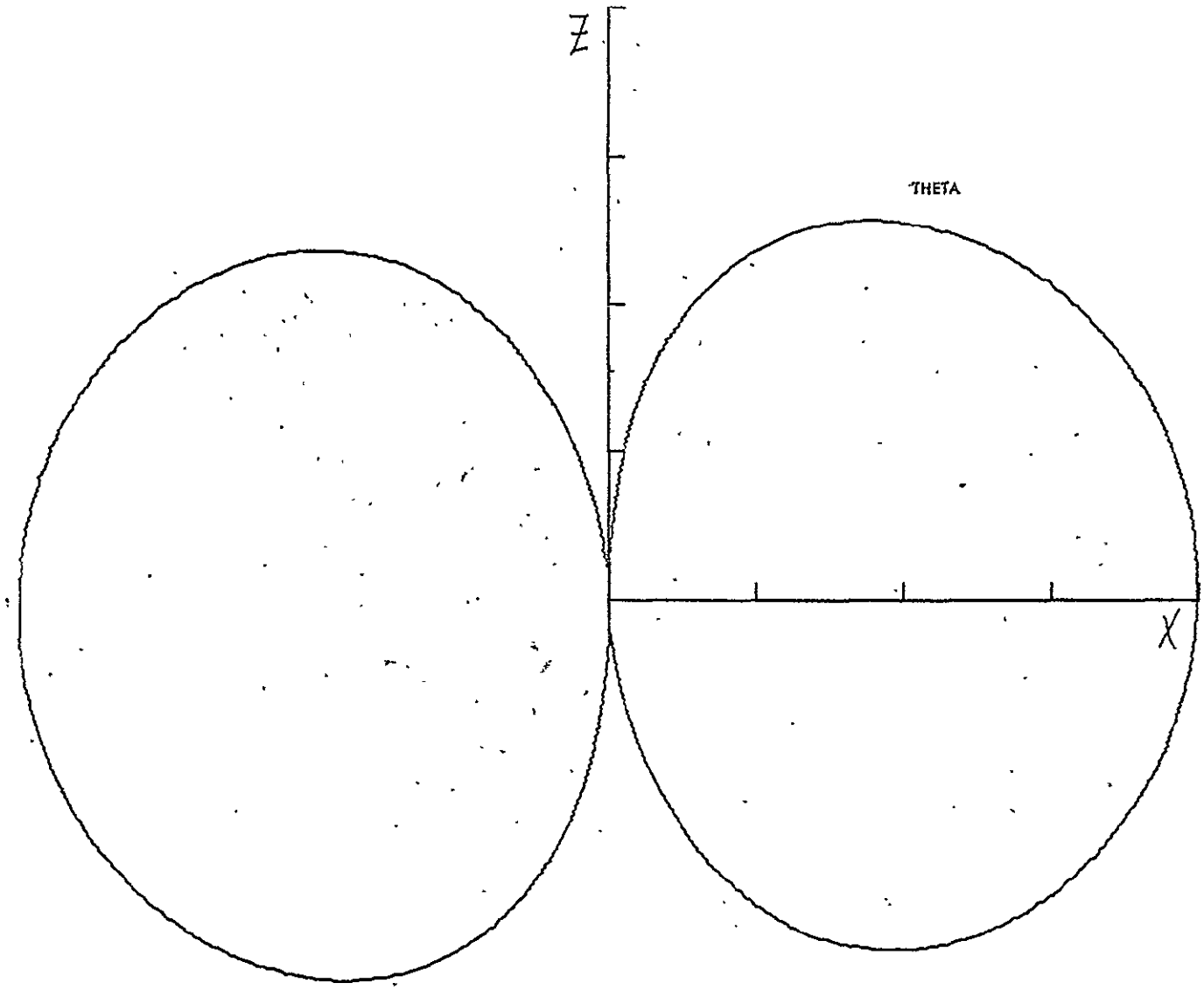

FIGURE B - 7

FREQUENCY (MHZ) .311
V-ANT. LENGTH (FT) 250
MODE BALANCED
DB MAX - 8.7
DB MIN -28.7

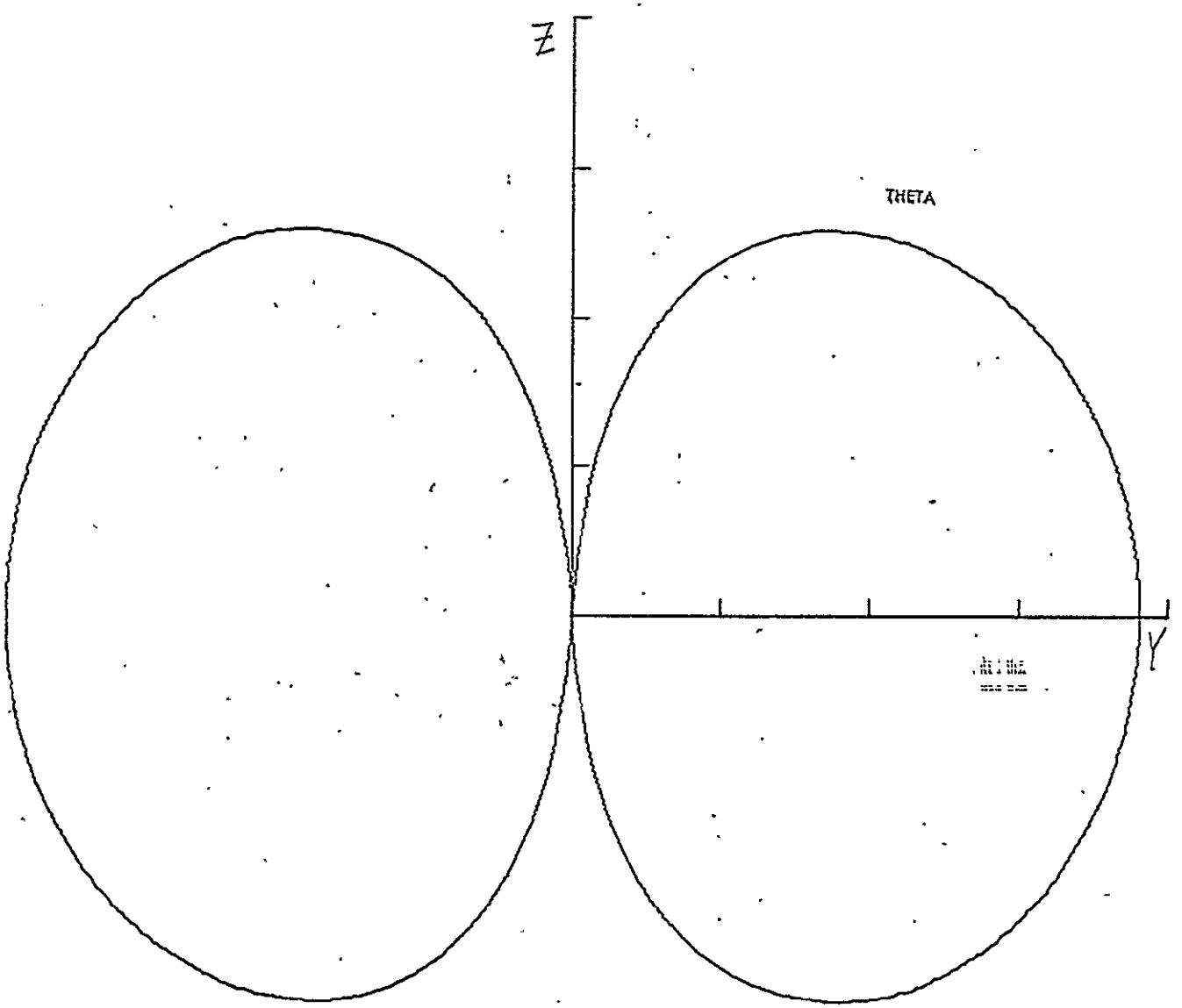

FIGURE B - 8

FREQUENCY (MHZ) .311
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX -8.7
DB MIN -28.7

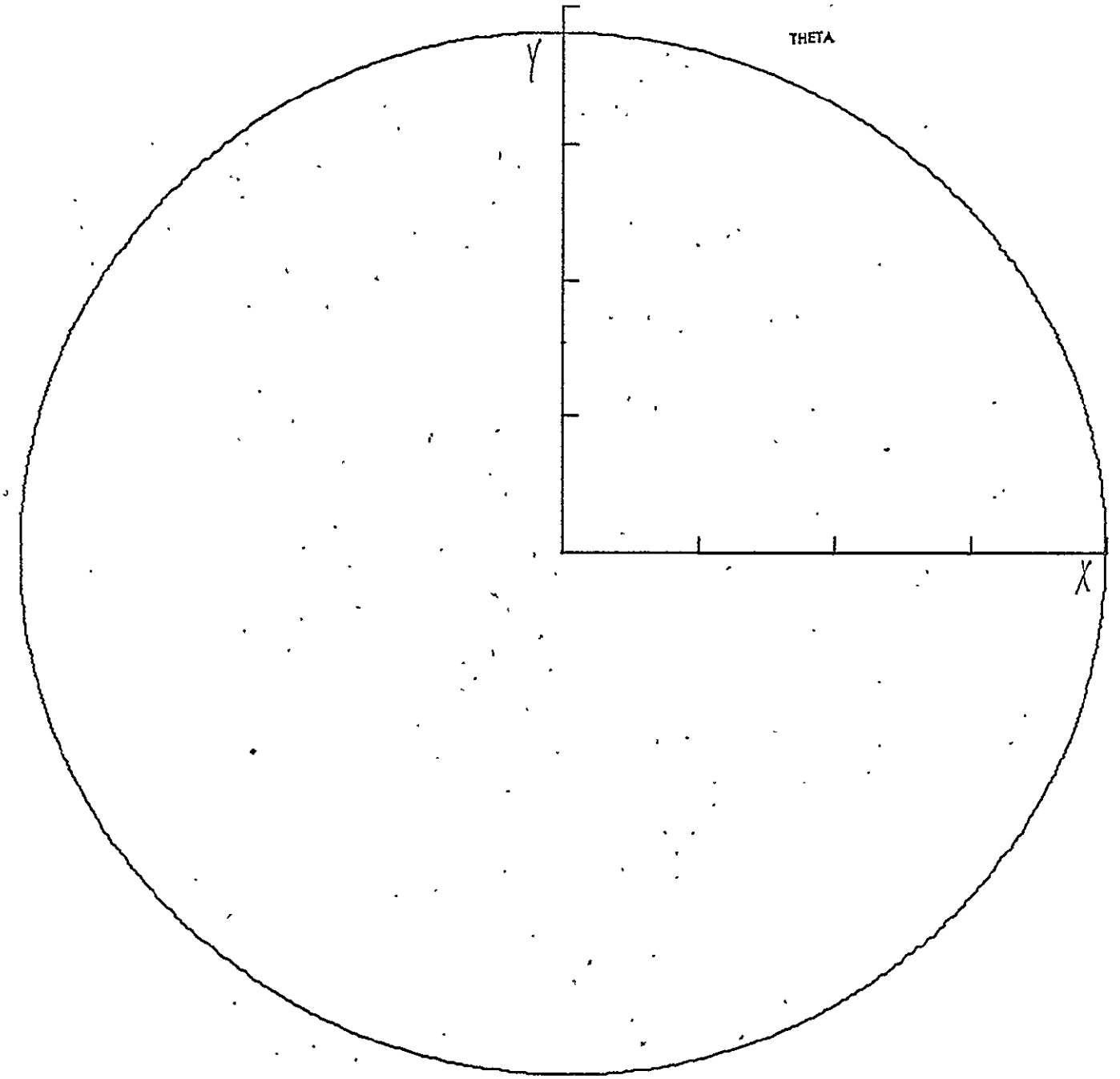

FIGURE B - 9

FREQUENCY (MHZ) .311
V-ANT. LENGTH (FT) 950
MODE BALANCED
DB MAX -8.7
DB MIN -28.7

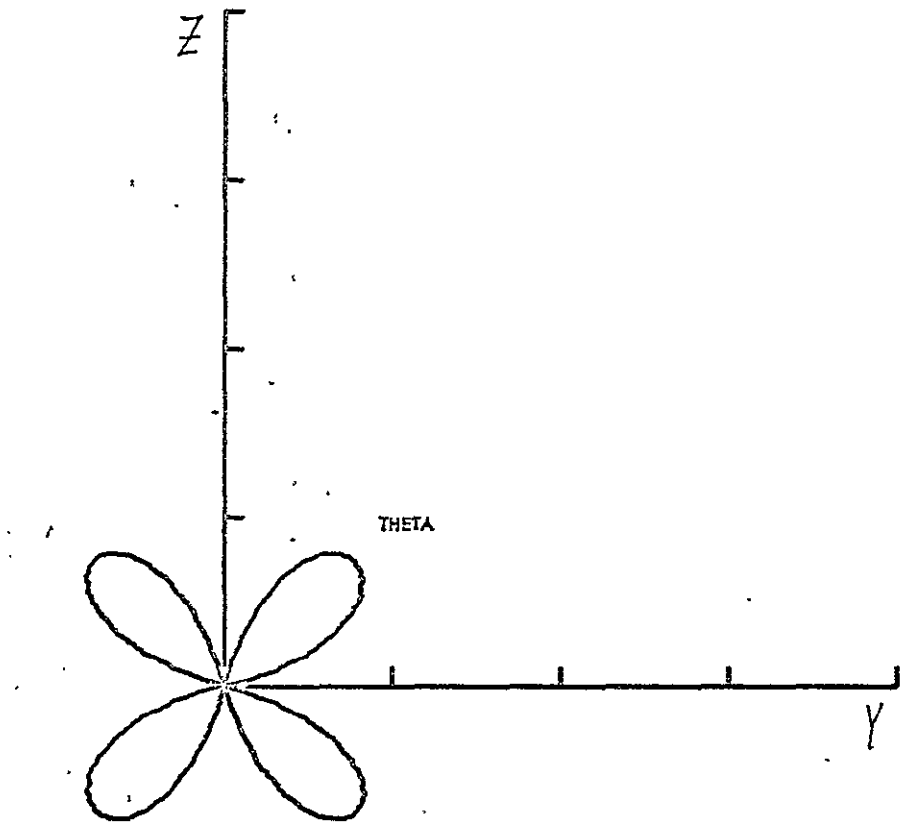

FIGURE B-10

FREQUENCY (MHZ) .311
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX -8.7
DB MIN -28.7

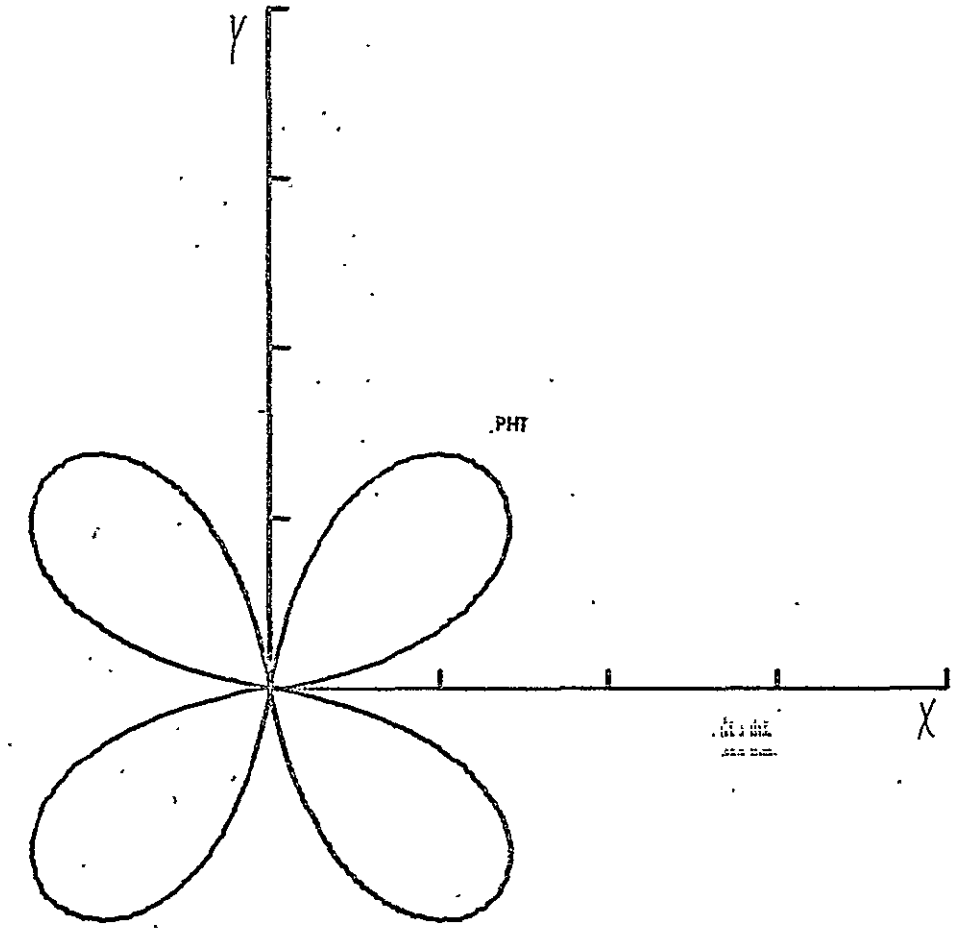

FIGURE B - 11

FREQUENCY (MHZ) .311
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX -8.7
DB MIN -28.7

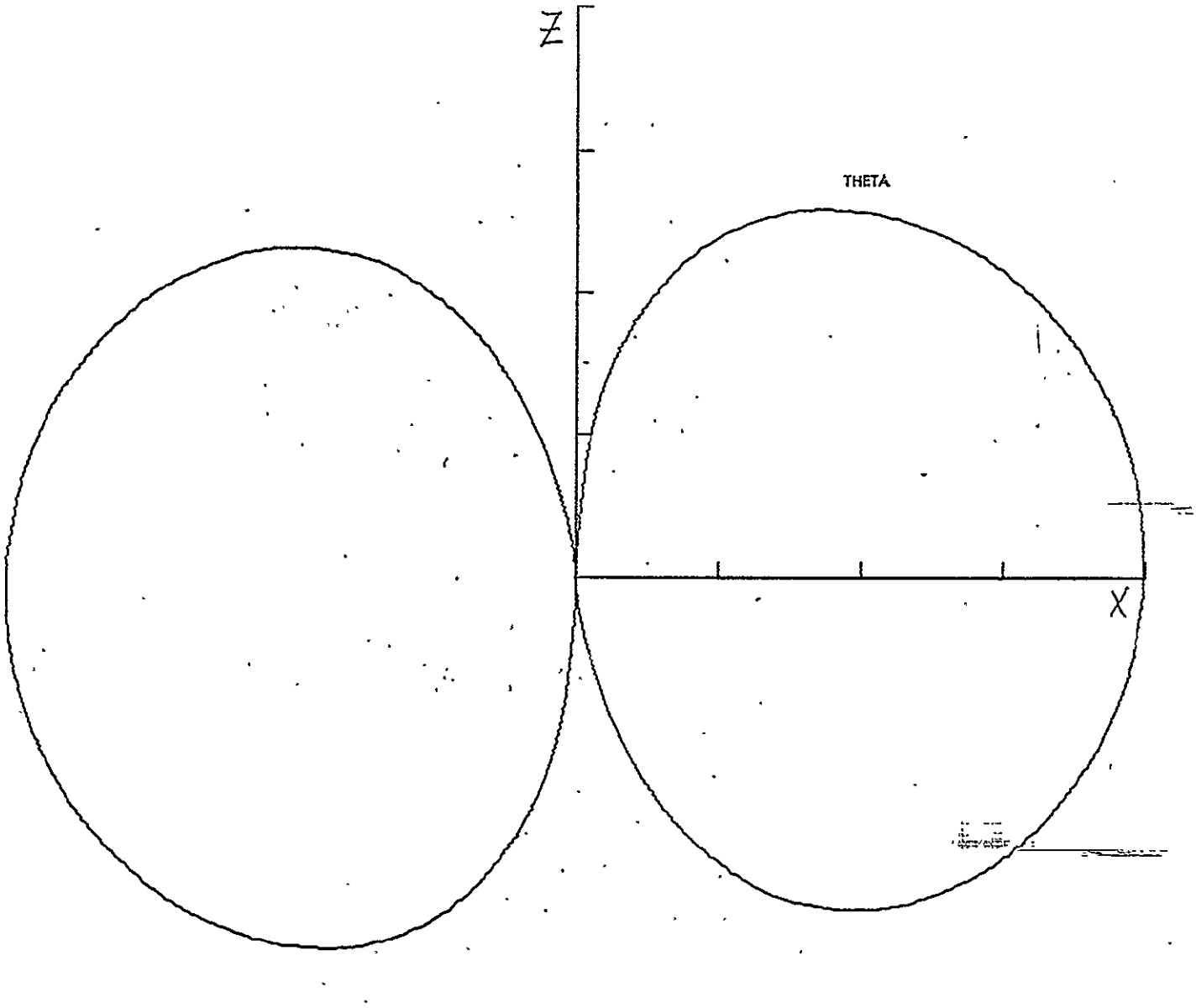

FIGURE B-12

FREQUENCY (MHZ) .369
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX -3.5
DB MIN -23.5

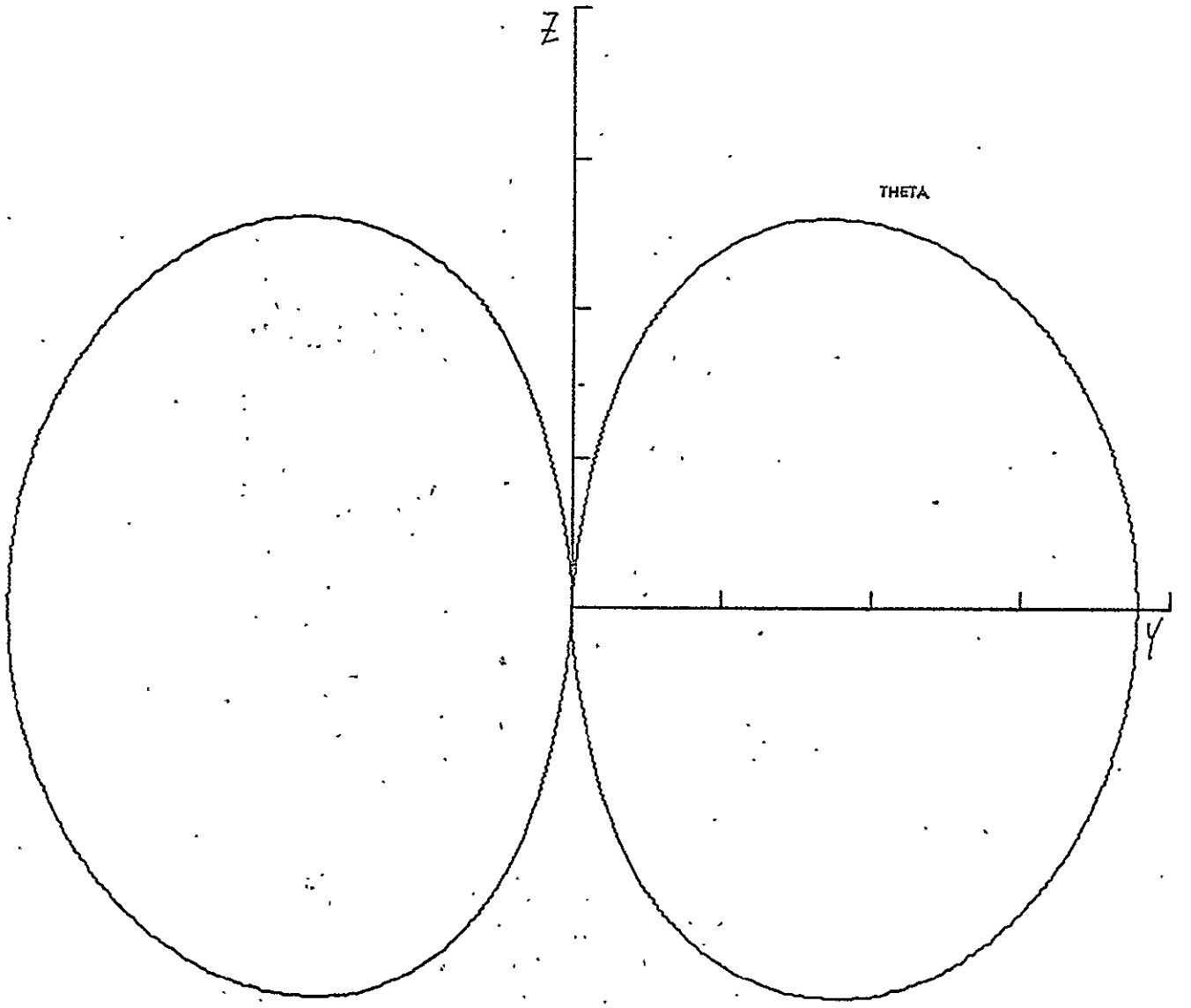

FIGURE B - 13

FREQUENCY (MHZ) .369
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX -3.5
DB MIN -23.5

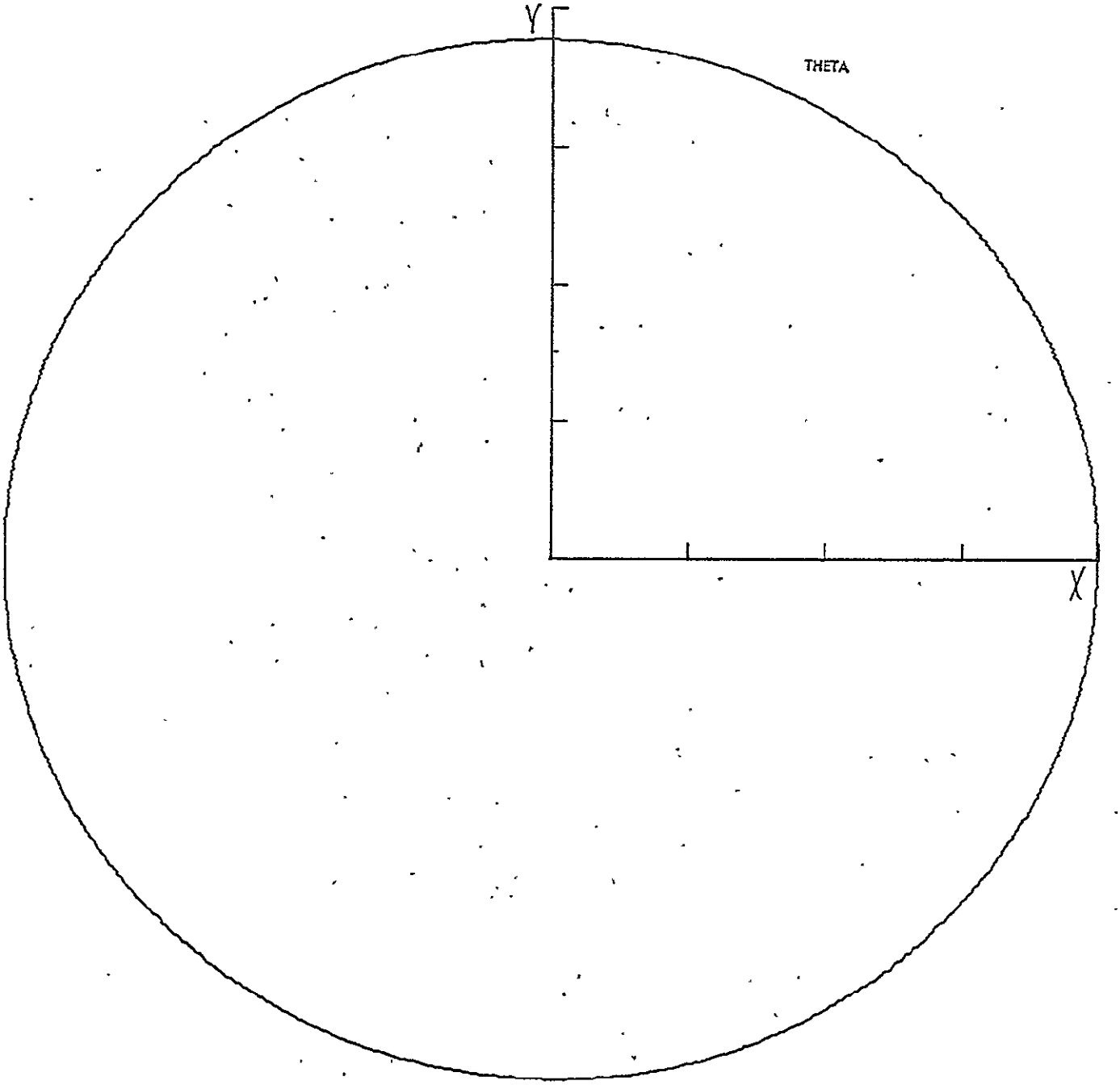

FIGURE B - 14

FREQUENCY (MHZ) .369
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX -3.5
DB MIN -23.5

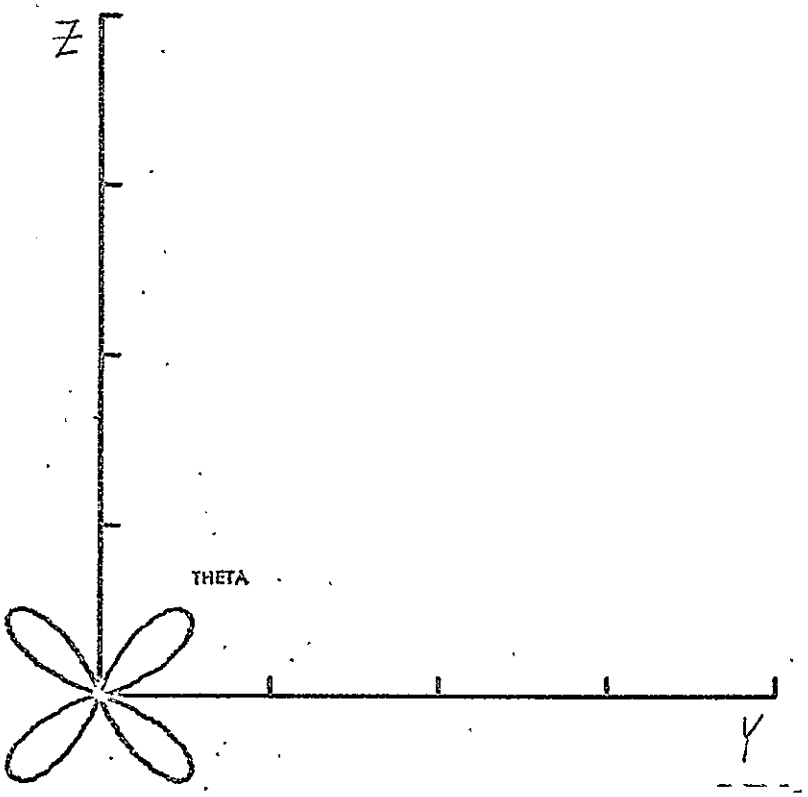

FIGURE B-15

FREQUENCY (MHZ) .369
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX -3.5
DB MIN -23.5

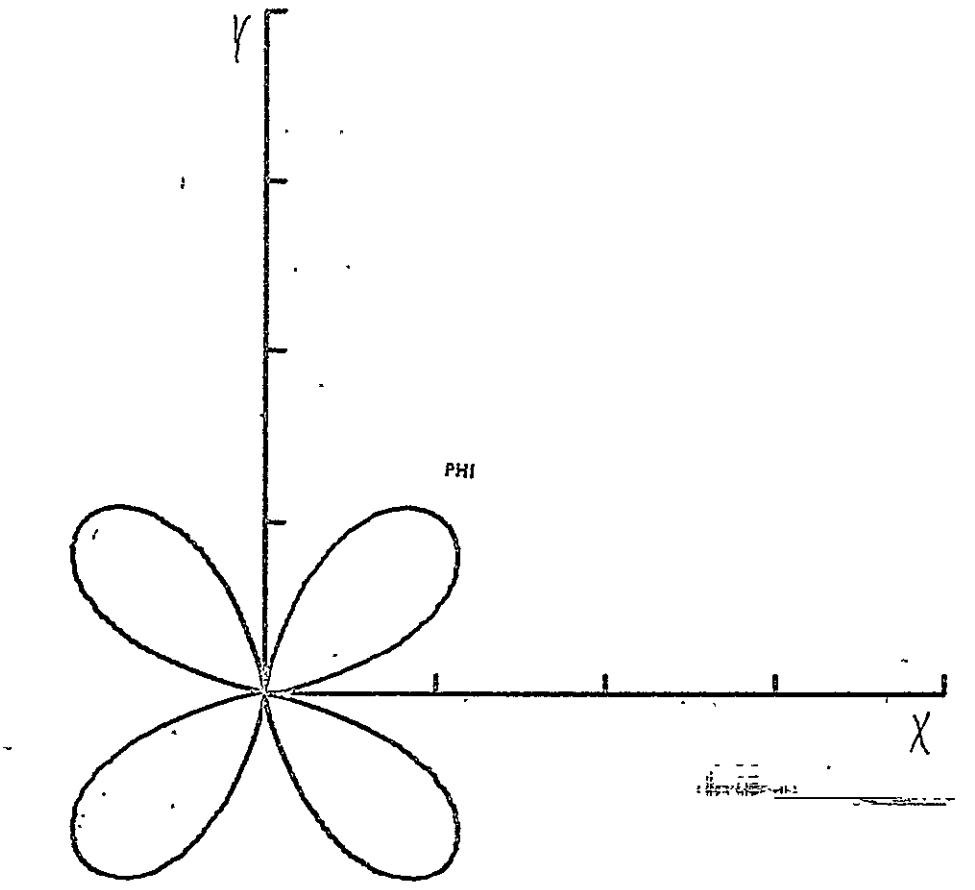

FIGURE B-16

FREQUENCY (MHZ) .369
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX -3.5
DB MIN -23.5

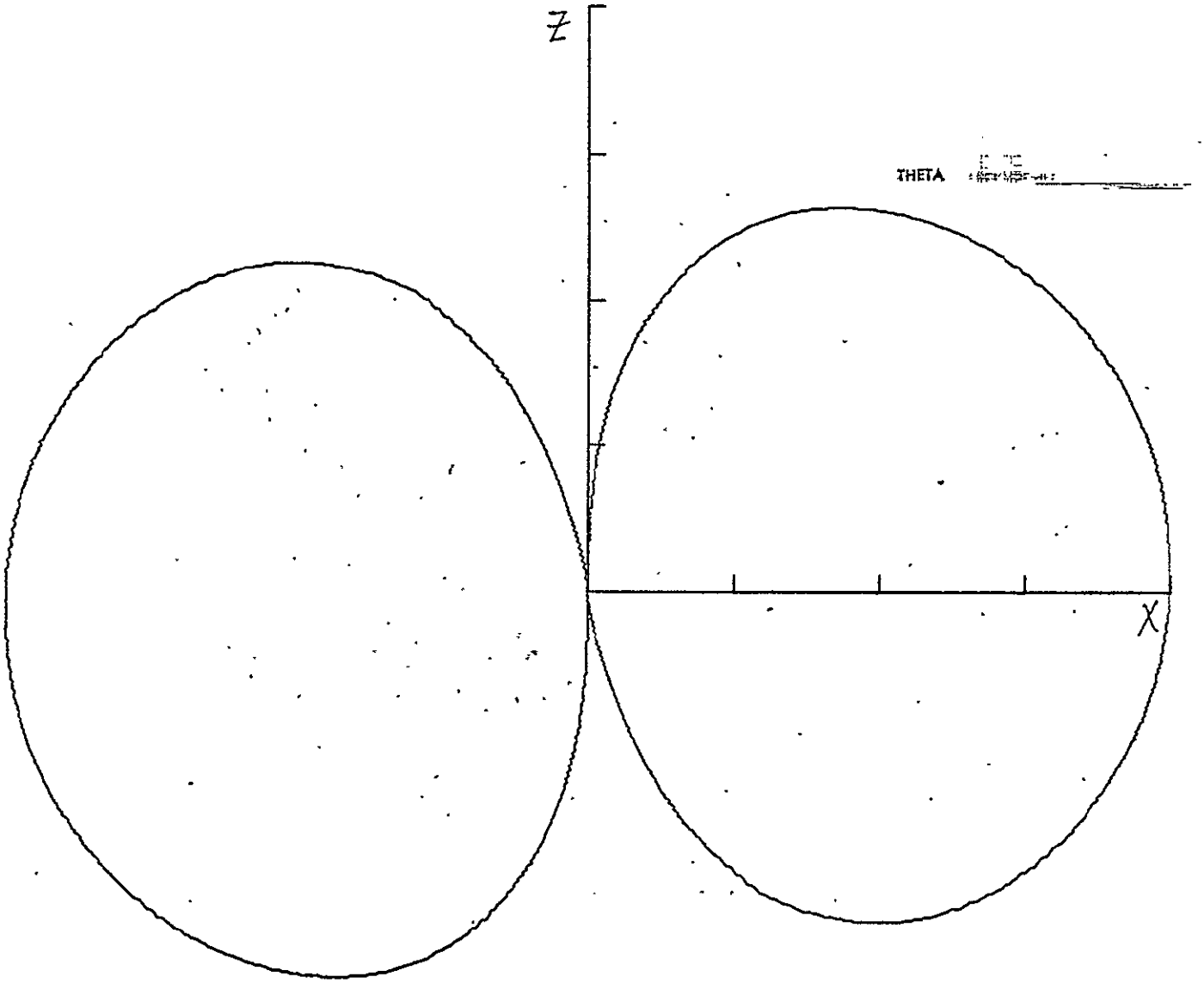

FIGURE B-17

FREQUENCY (MHZ) .450
V-ANT. LENGTH (FT) 250
MODE BALANCED
DB MAX -2.1
DB MIN -22.1

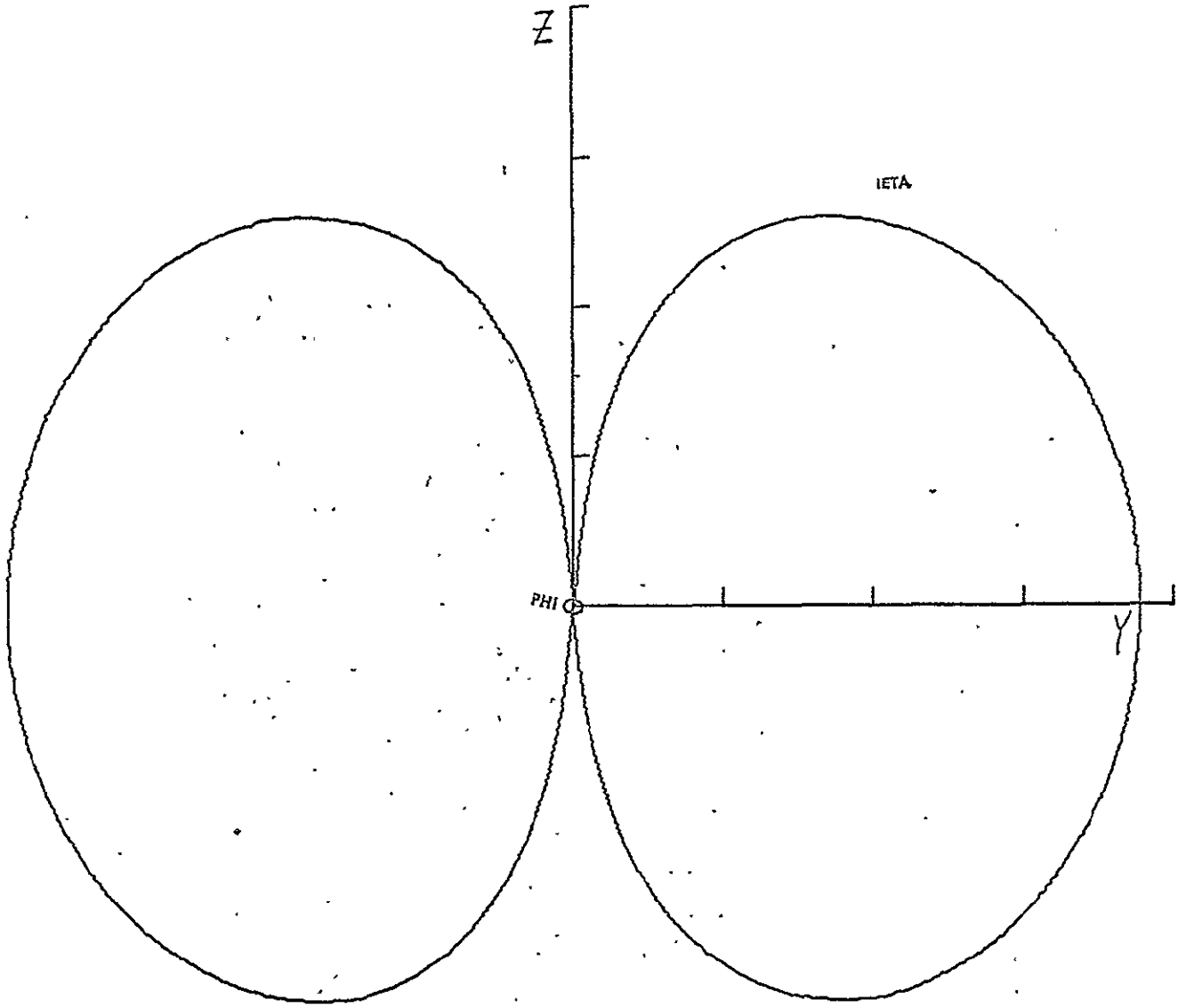

FIGURE B - 18

FREQUENCY (MHZ) .450
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX - 2.1
DB MIN -22.1

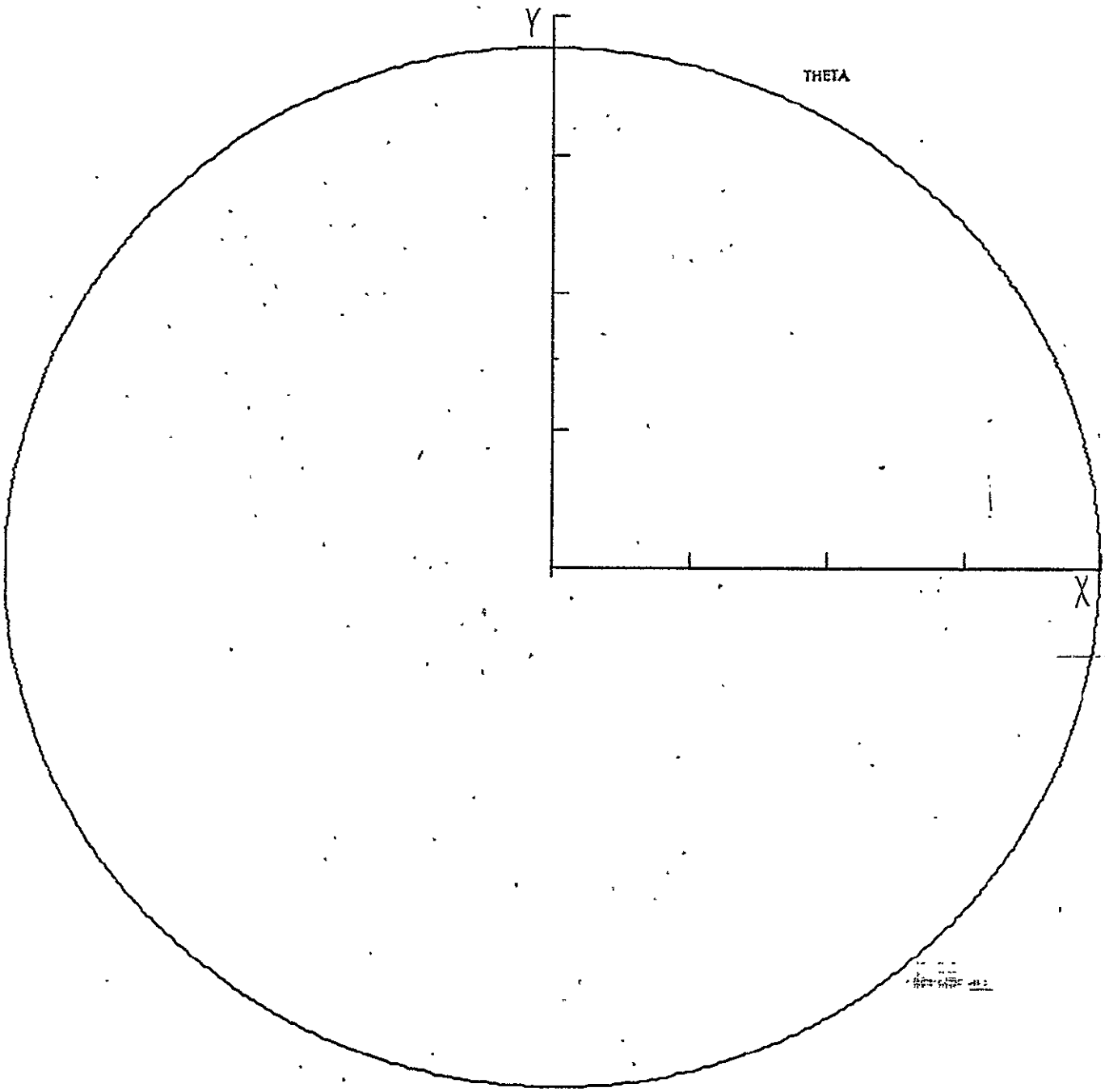

FIGURE B - 19

FREQUENCY (MHZ) .450
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX -2.1
DB MIN -22.1

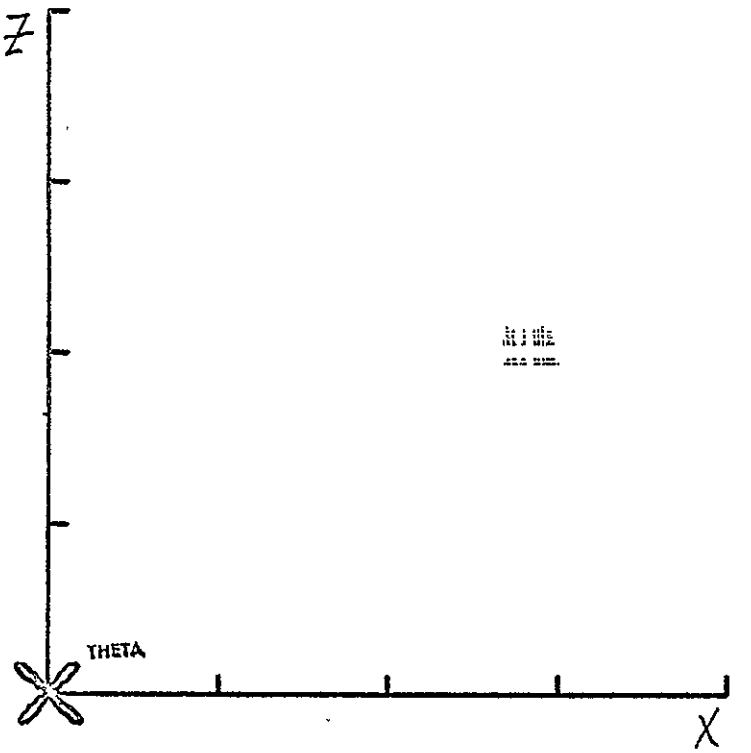

FIGURE B-20

FREQUENCY (MHZ) 450
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX -2.1
DB MIN -22.1

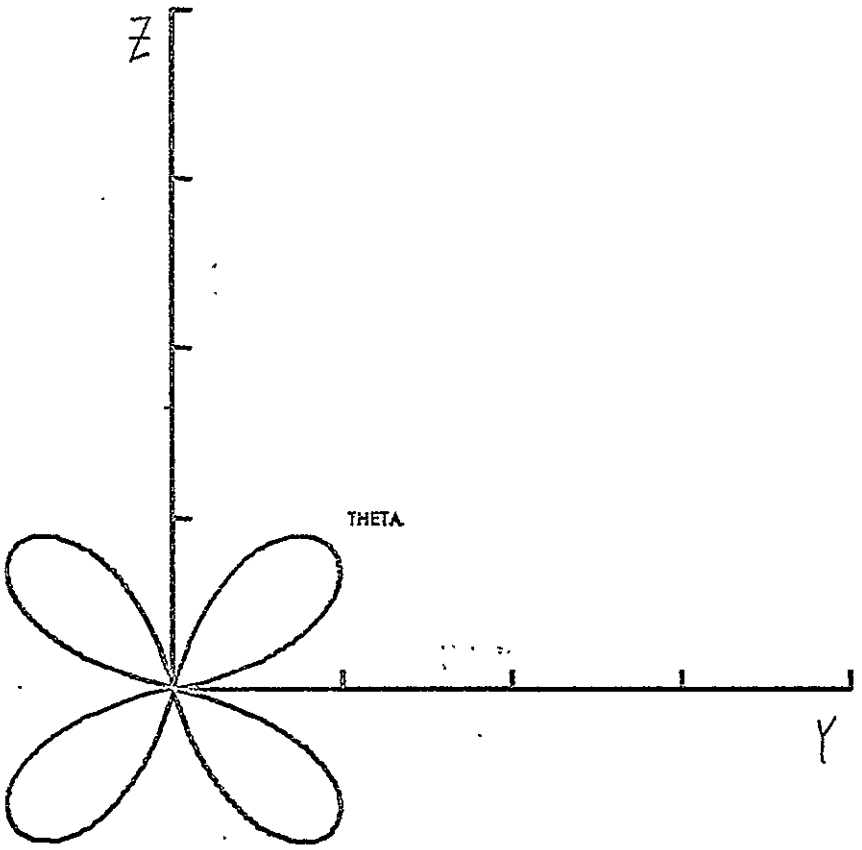

FIGURE B - 21

FREQUENCY (MHZ) .450
V-ANT. LENGTH (FT) 750
MODE. UNBALANCED.
DB MAX - 2.1
DB MIN -22.1

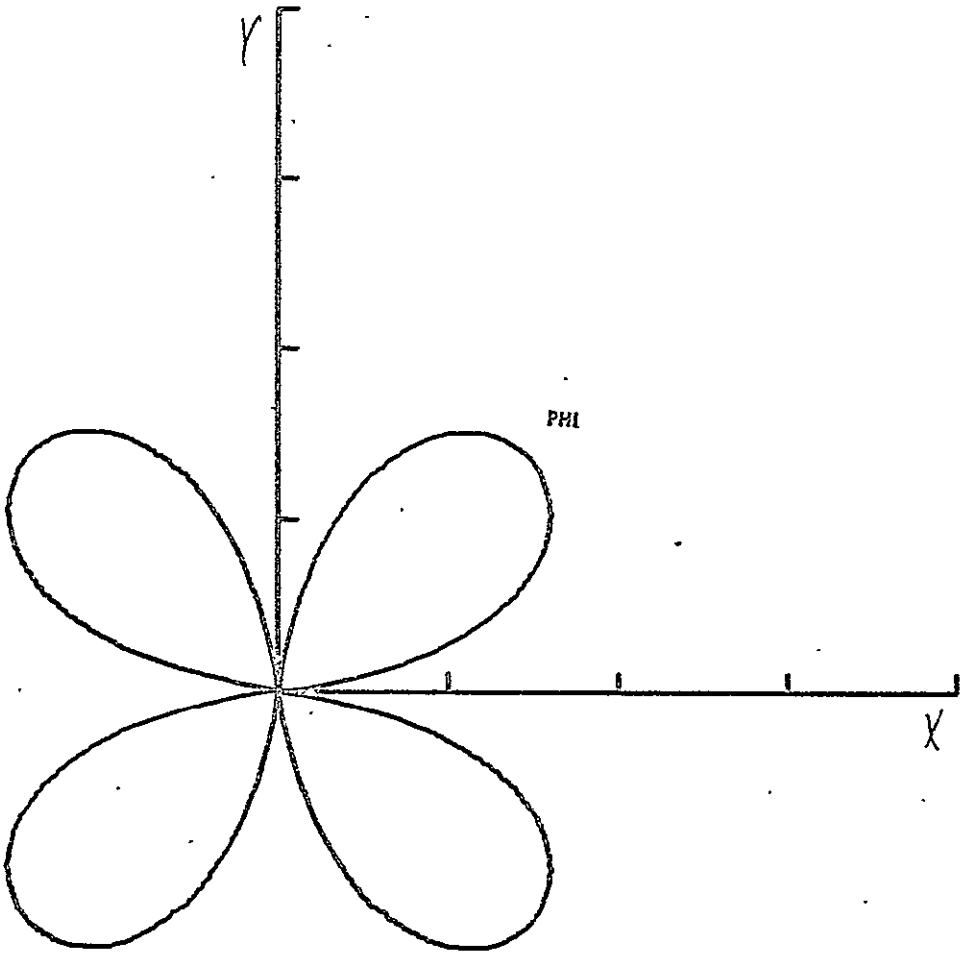

FIGURE B-22

FREQUENCY (MHZ) .450
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX -2.1
DB MIN -22.1

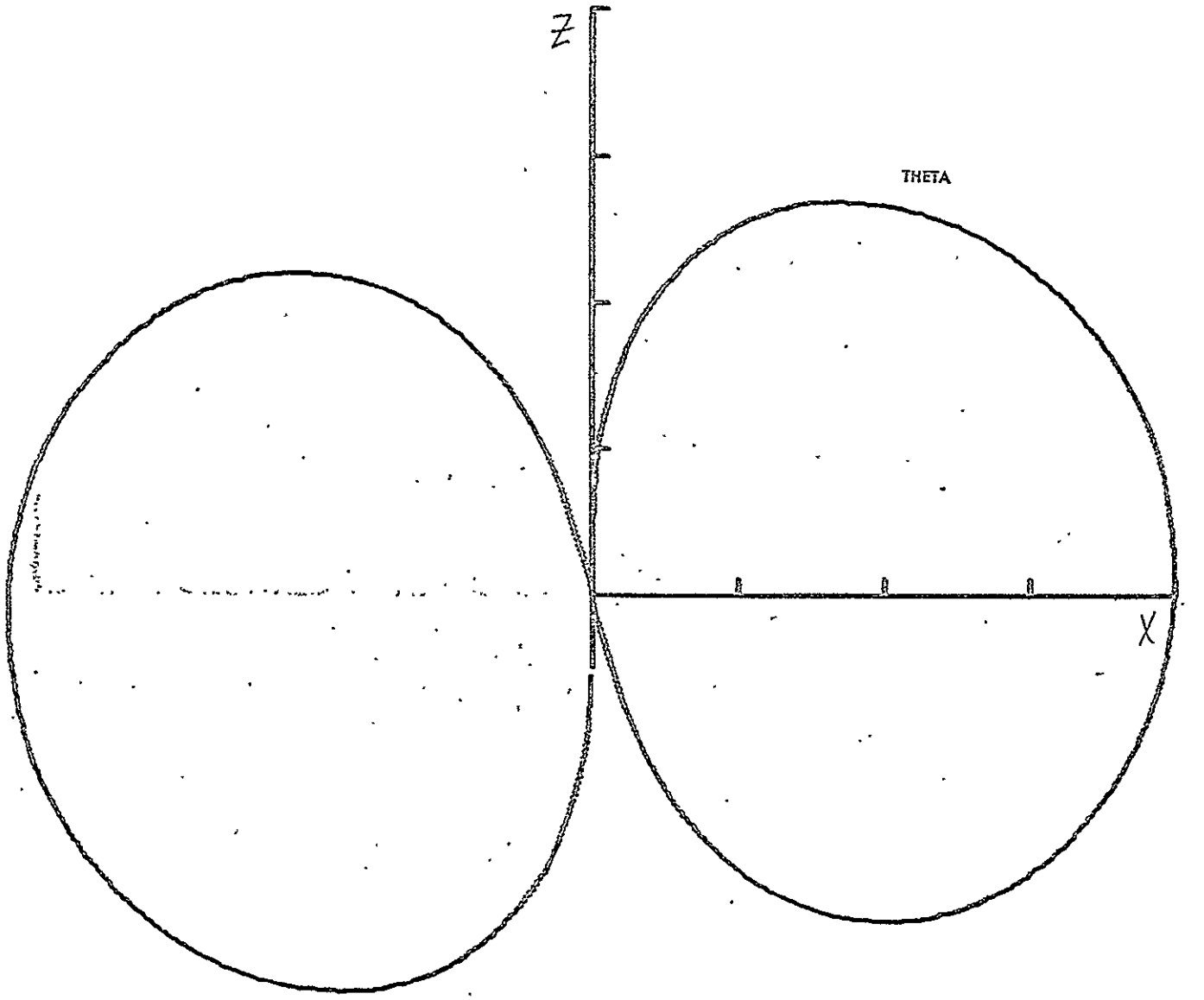

FIGURE B-23

FREQUENCY (MHZ) .540
V-ANT. LENGTH (FT) 950
MODE BALANCED
DB MAX -2.8
DB MIN -22.8

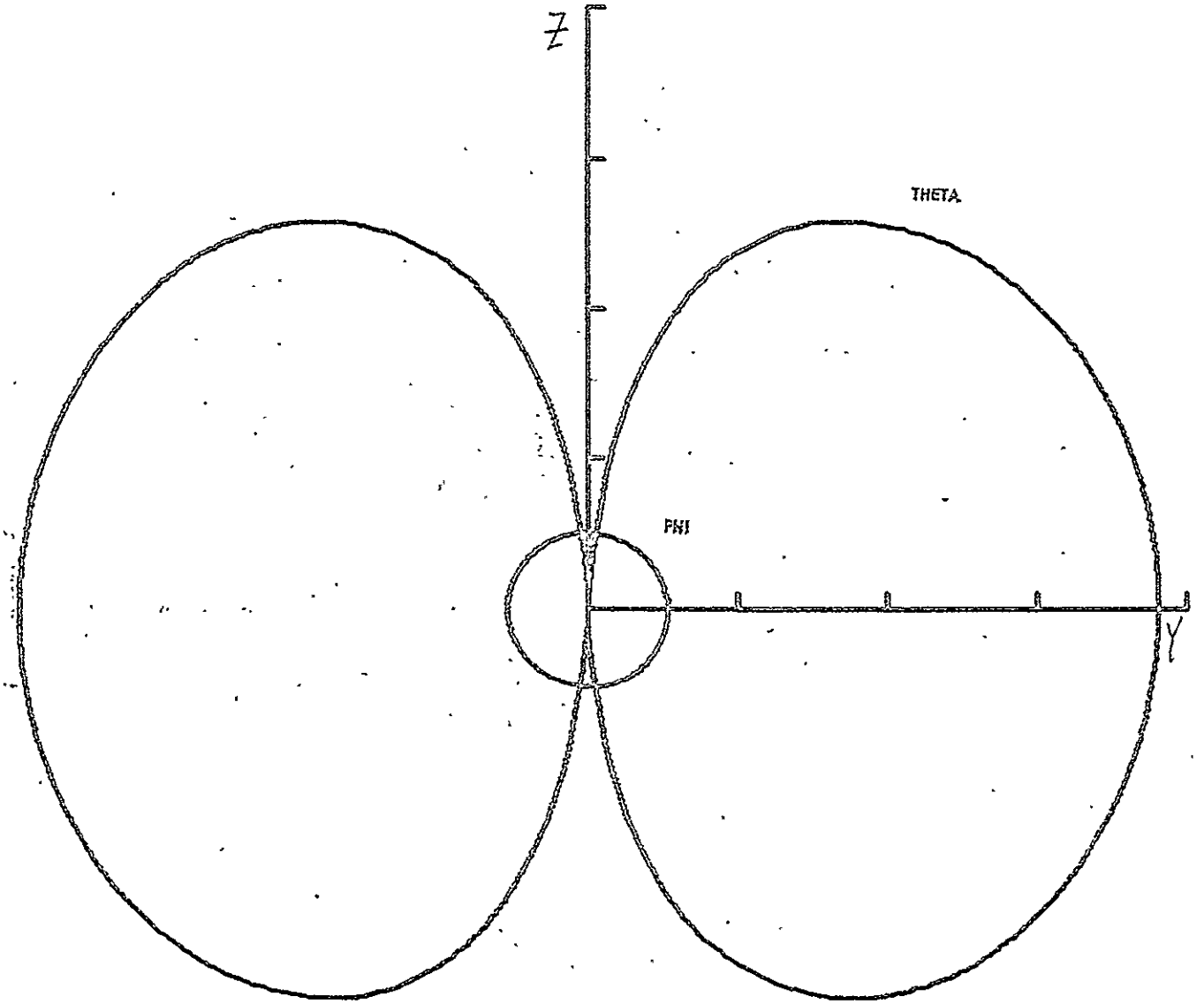

FIGURE B-24

FREQUENCY (MHZ) .540
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX -2.8
DB MIN -22.8

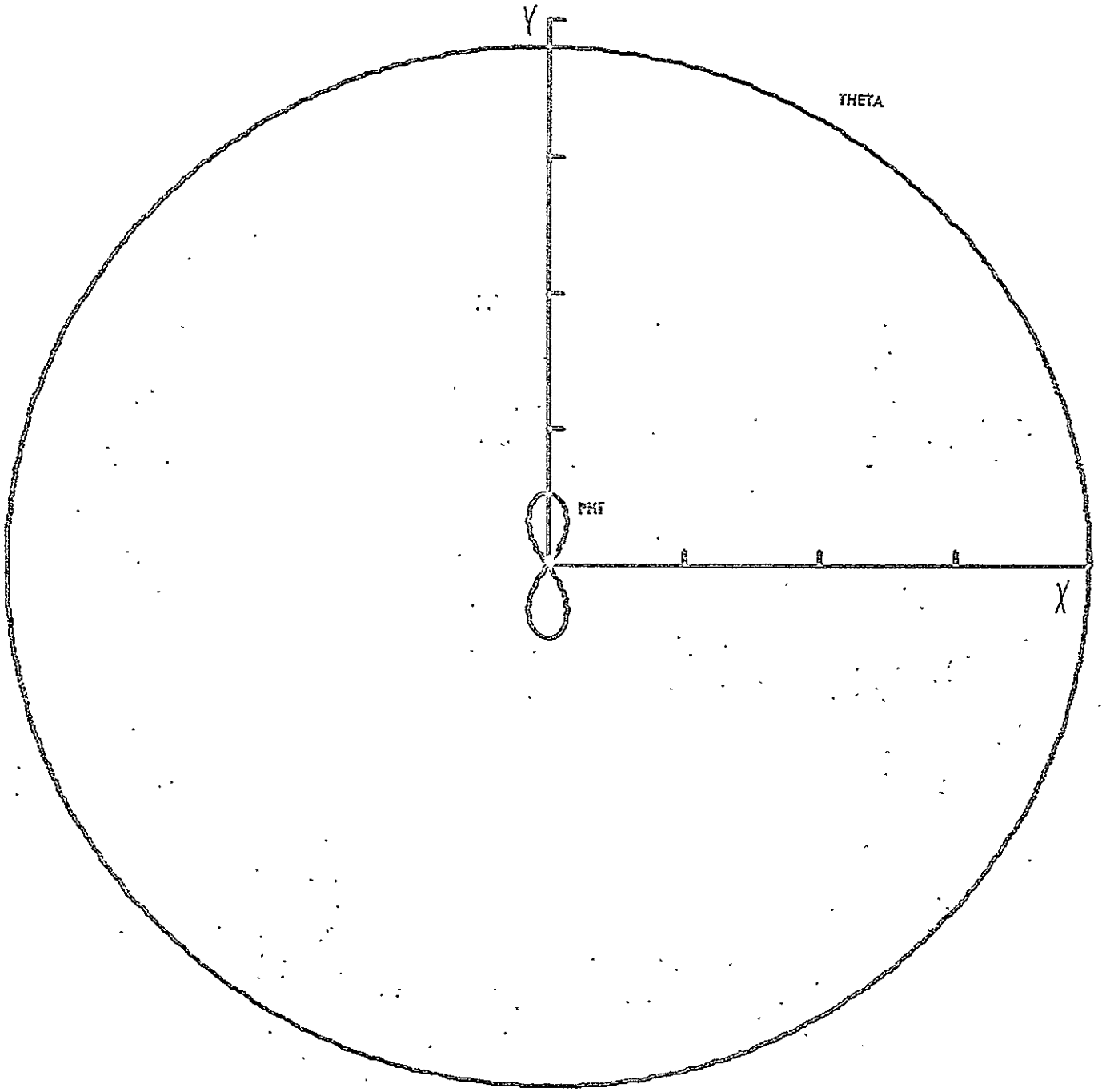

FIGURE B-2.5

FREQUENCY (MHZ) .540
V-ANT. LENGTH (FT) 950
MODE BALANCED
DB MAX -2.8
DB MIN -22.8

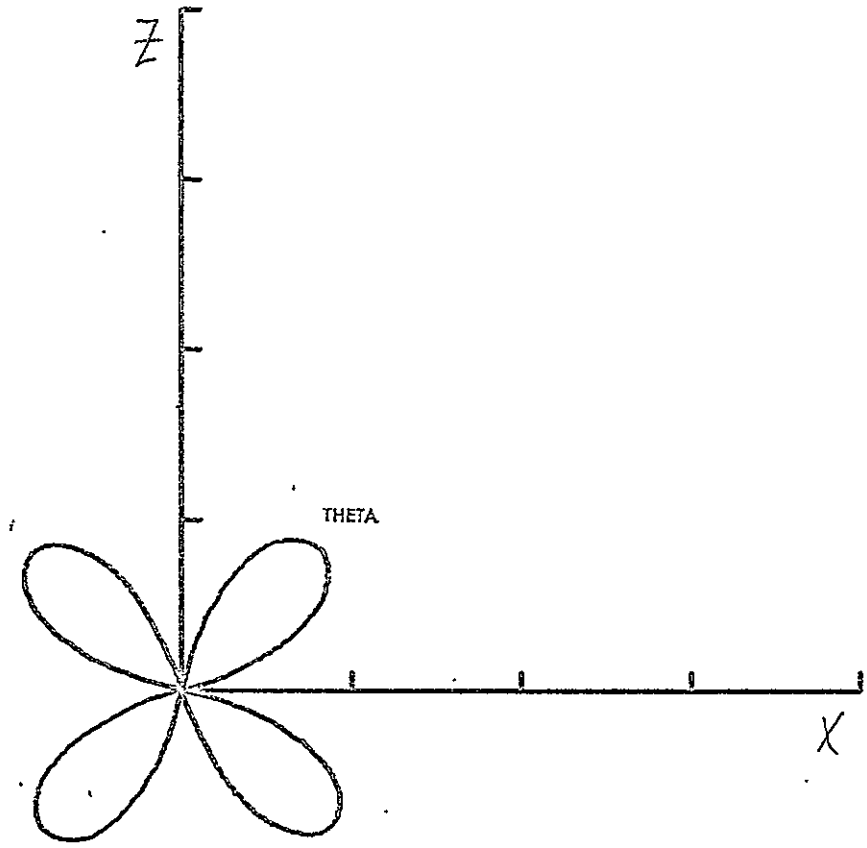

FIGURE B-2.6

FREQUENCY (MHZ) .540
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX -2.8
DB MIN -22.8

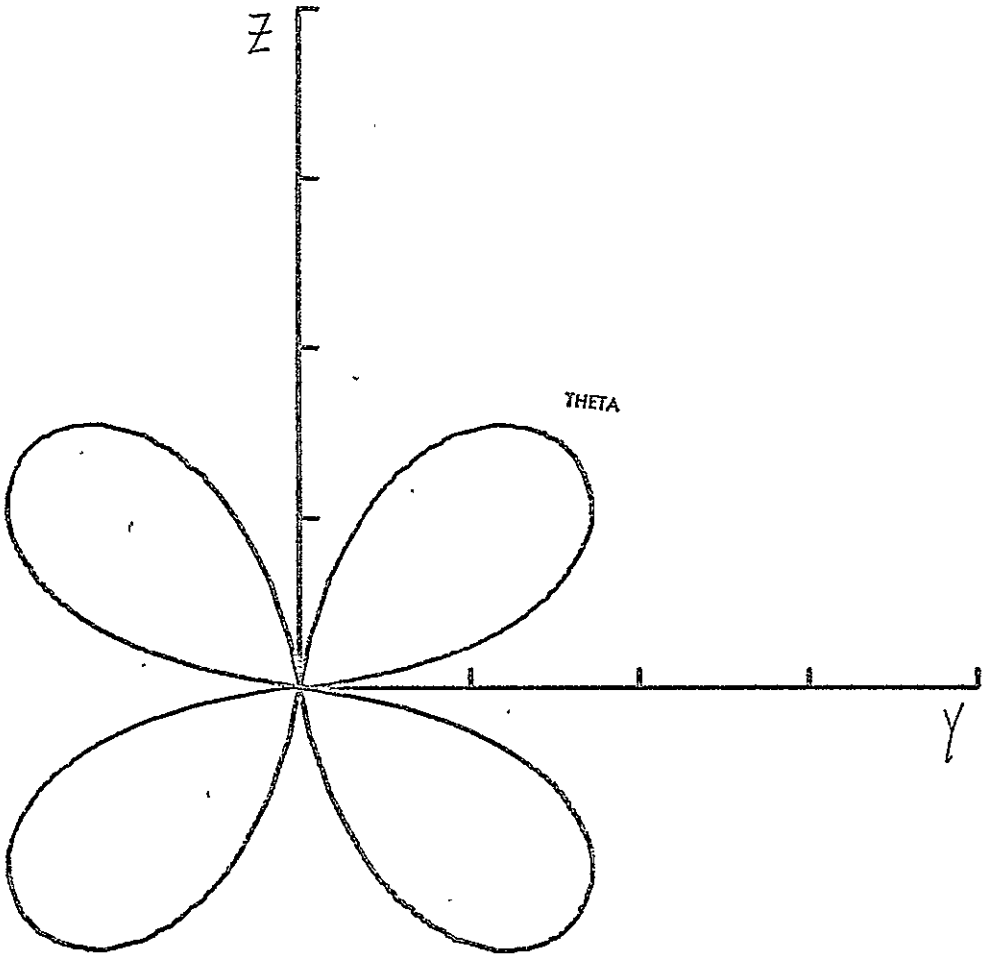

FIGURE B-27

FREQUENCY (MHZ) .540
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX -2.8
DB MIN -22.8

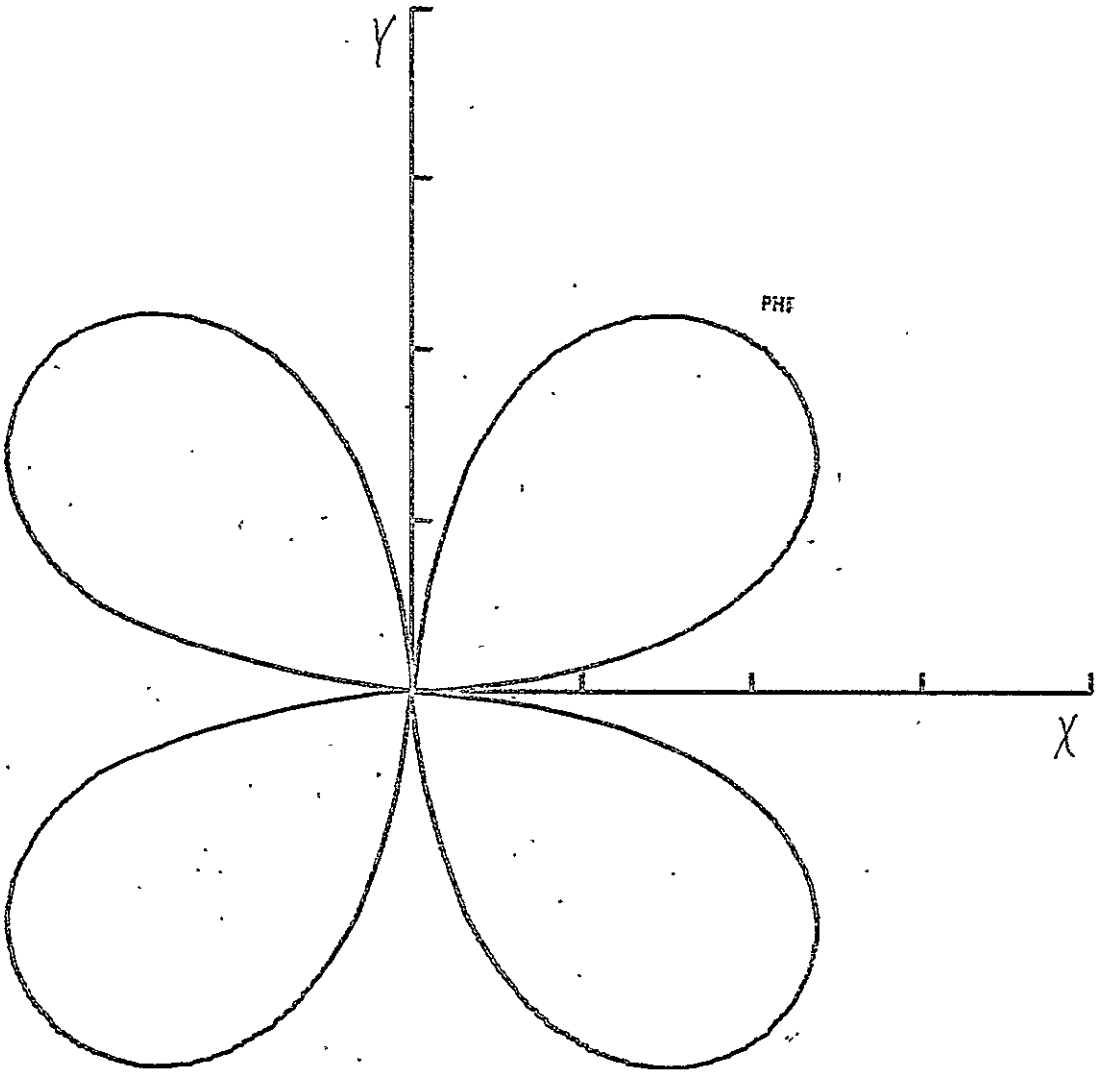

FIGURE B-28

FREQUENCY (MHZ) .540
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX -2.8
DB MIN -22.8

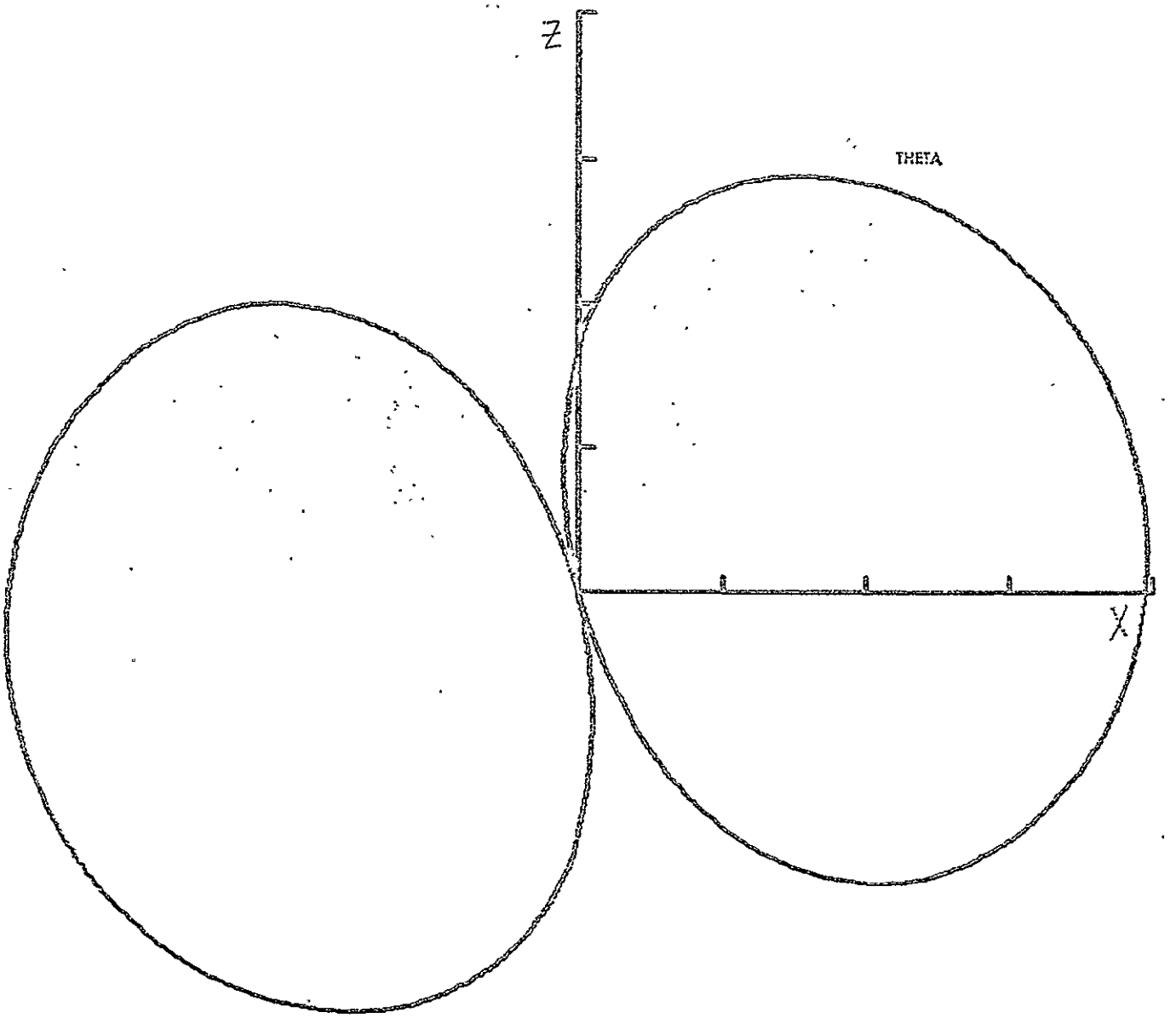

FIGURE B-29

FREQUENCY (MHZ) .700
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX -2.8
DB MIN -22.8

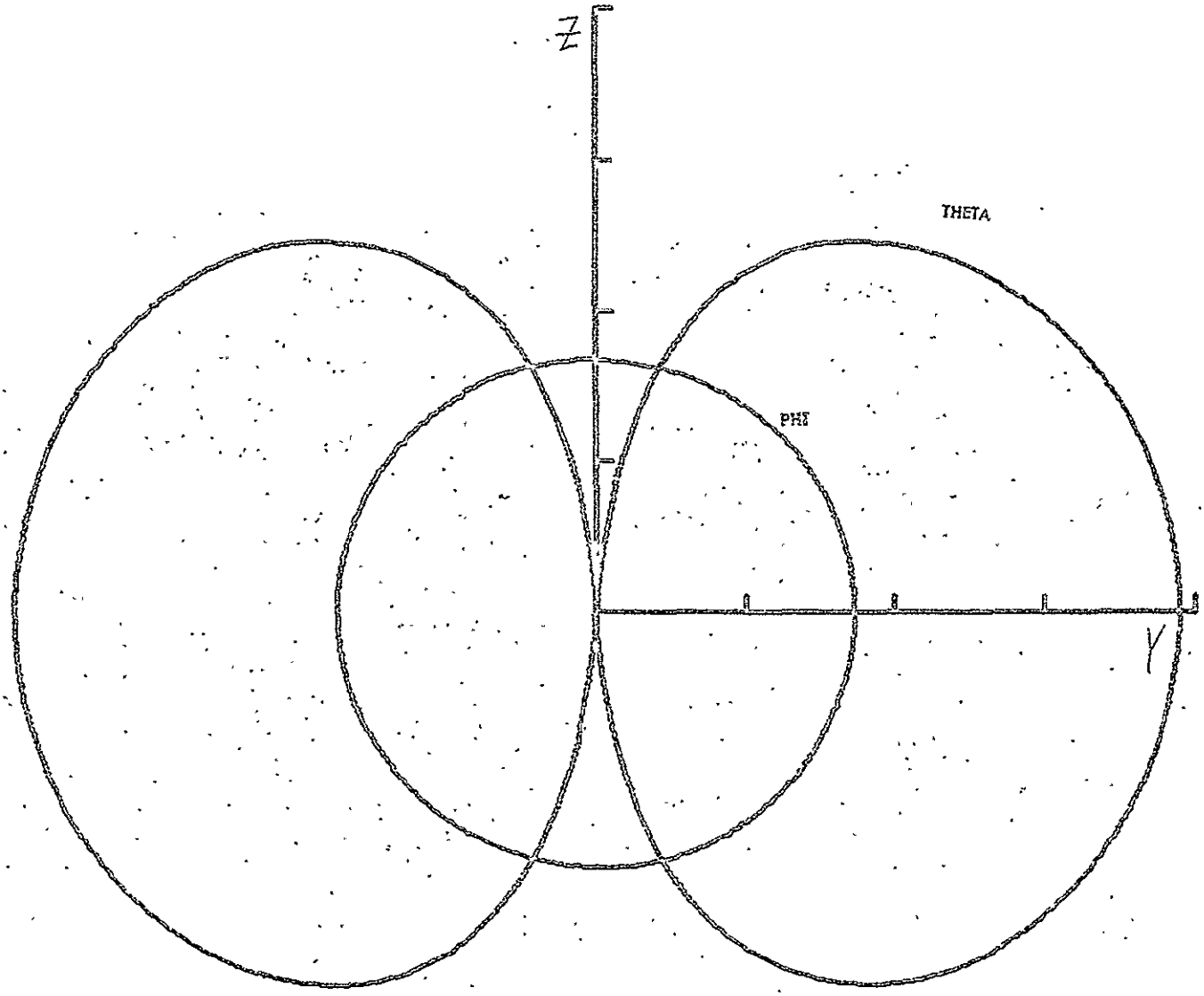

FIGURE B-30

FREQUENCY (MHZ) .700
V-ANT. LENGTH (FT) 250
MODE BALANCED
DB MAX -2.8
DB MIN -22.8

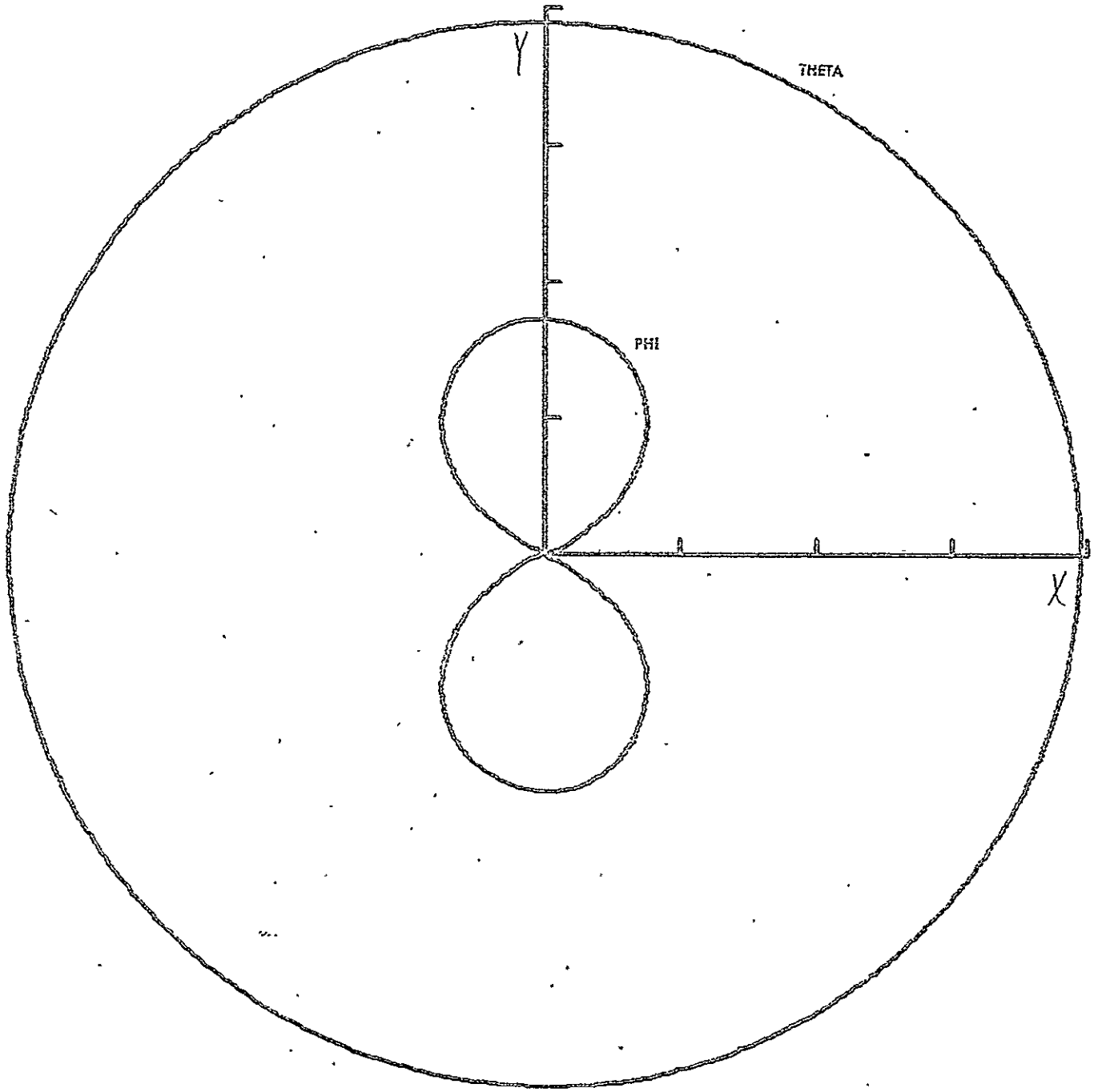

FIGURE B-31

FREQUENCY (MHZ) .700
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX -2.8
DB MIN -22.8

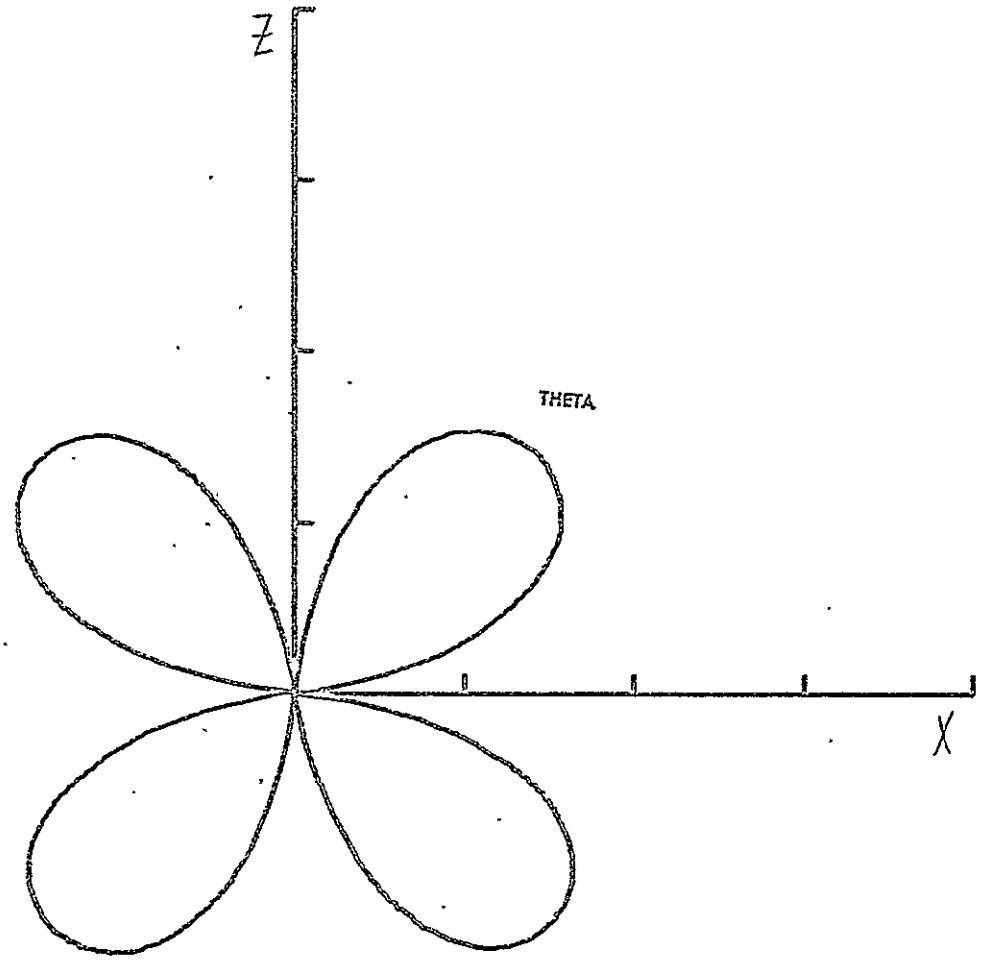

FIGURE B-32

FREQUENCY (MHZ) .700
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX -2.8
DB MIN -22.8

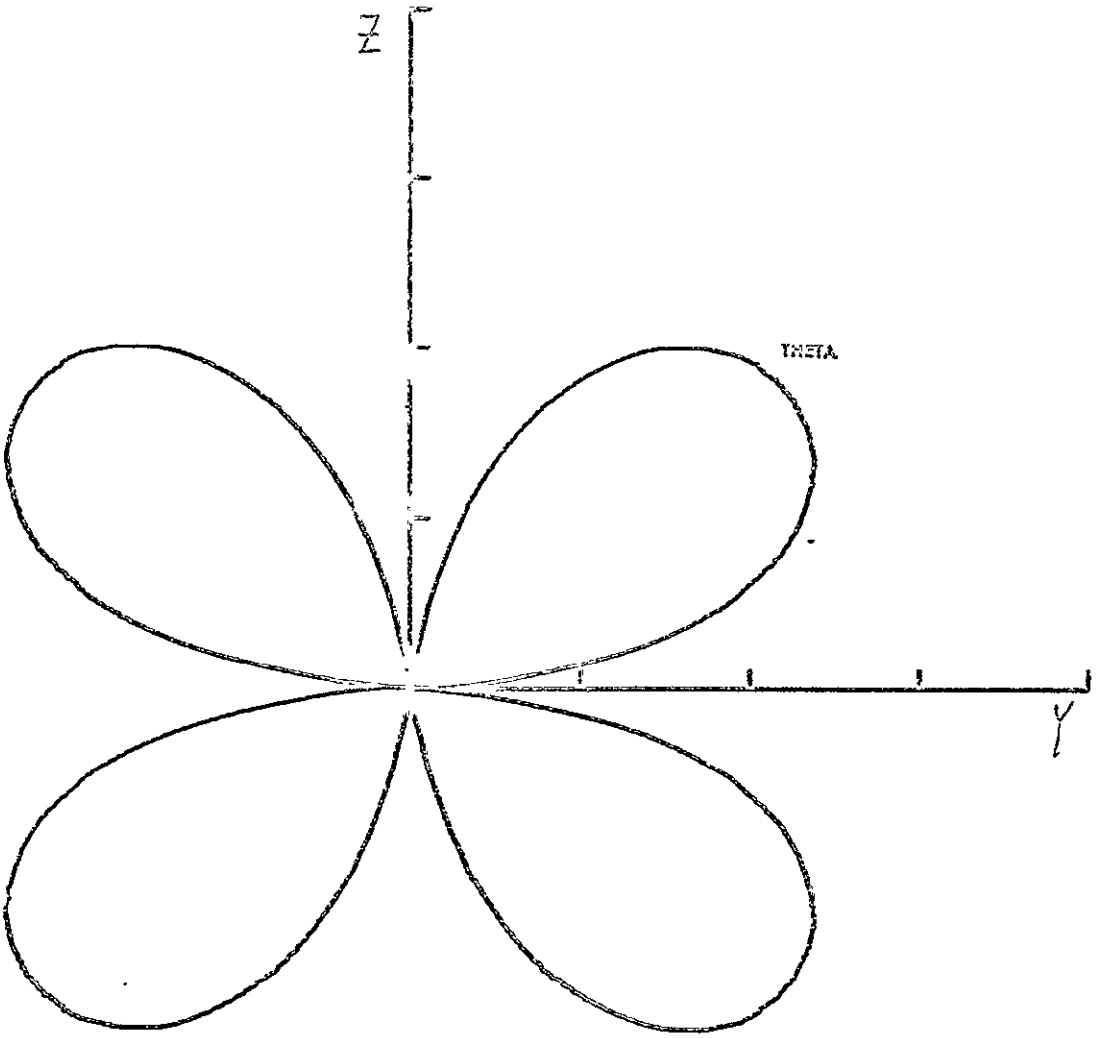

FIGURE B-33

FREQUENCY (MHZ) .700
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX -2.8
DB MIN -22.8

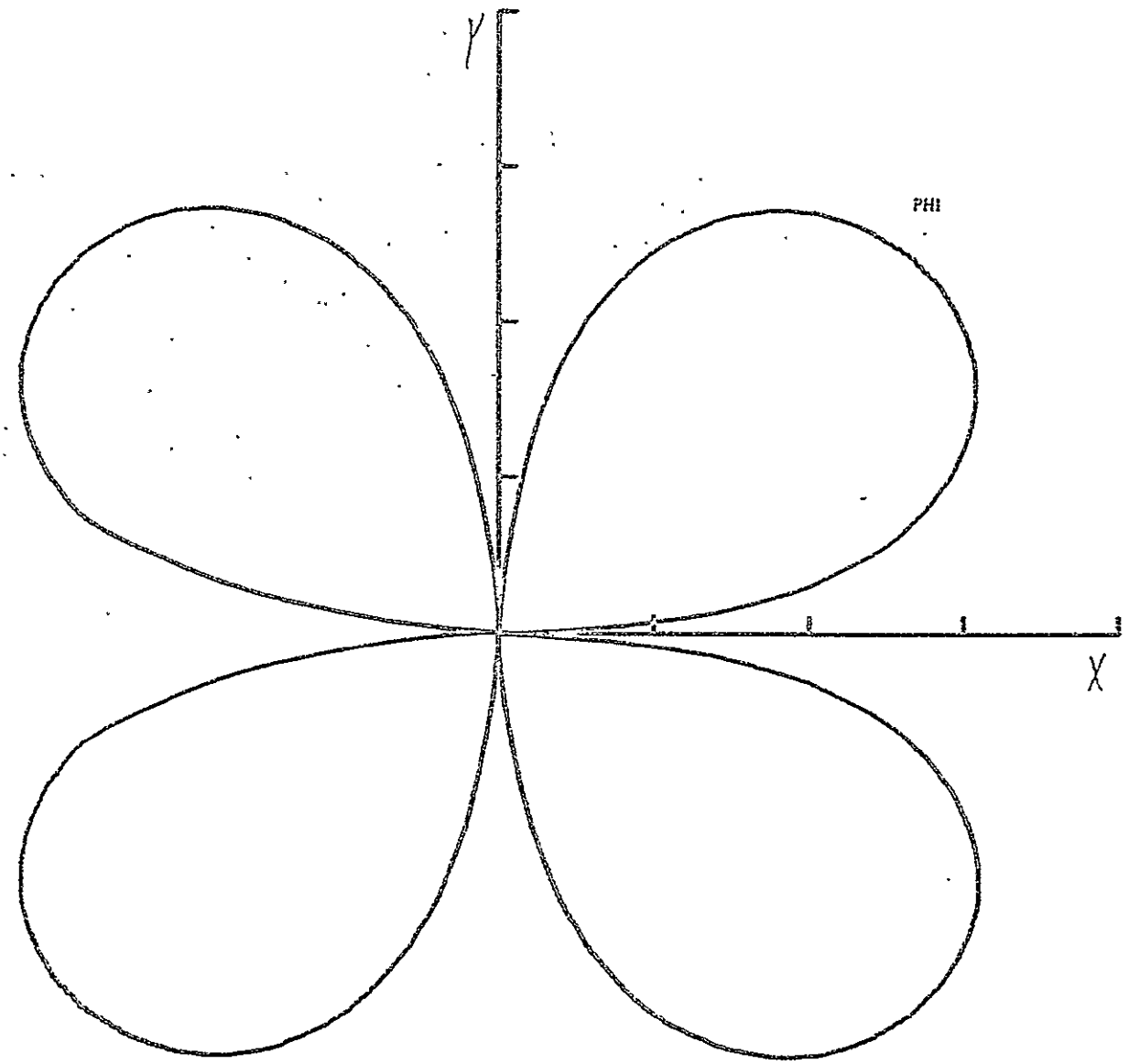

FIGURE B-34

FREQUENCY (MHZ) .700
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX -2.8
DB MIN -22.8

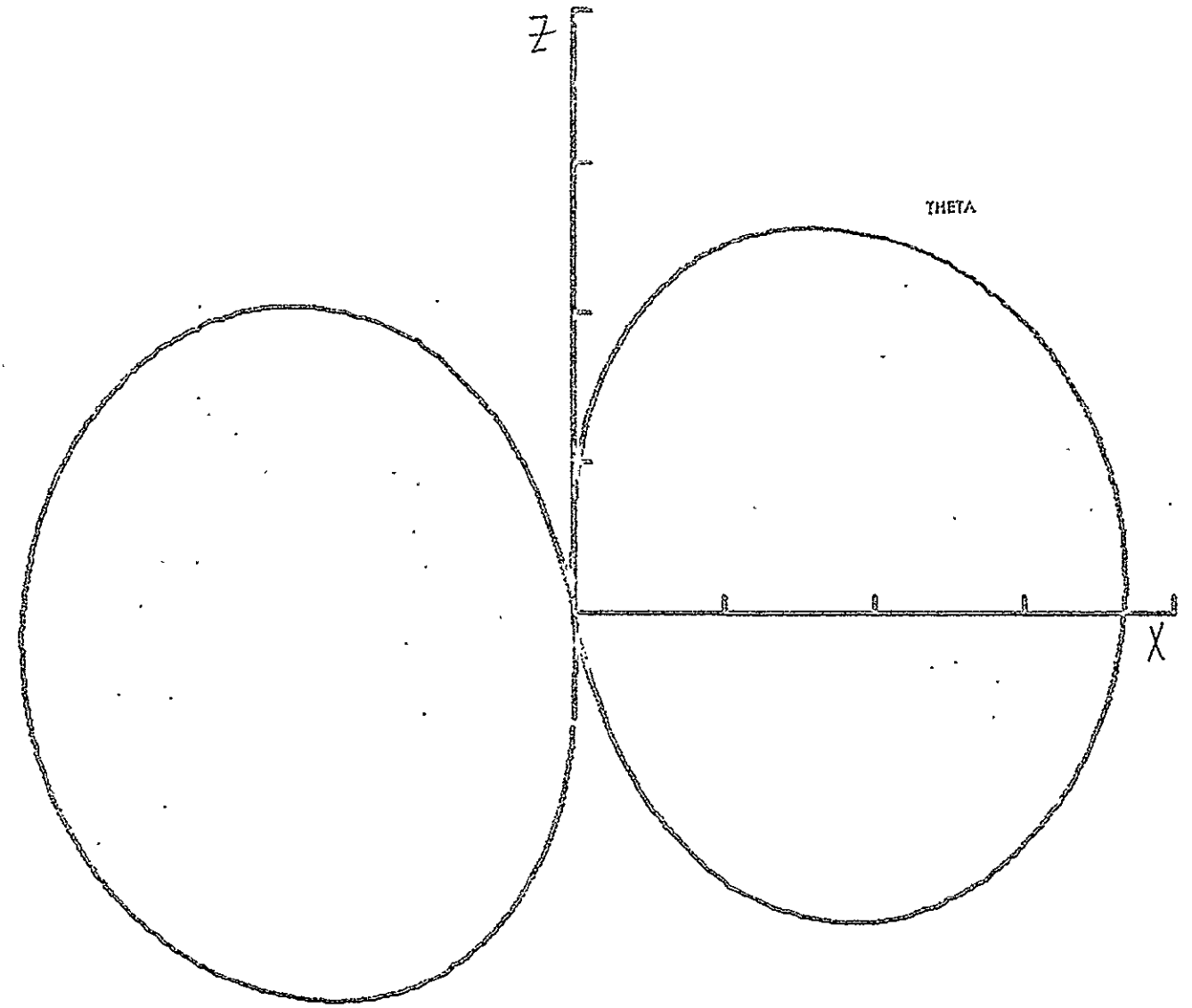

FIGURE B-35

FREQUENCY (MHZ) .900
V-ANT. LENGTH (FT) 950
MODE BALANCED
DB MAX -0.5
DB MIN -20.5

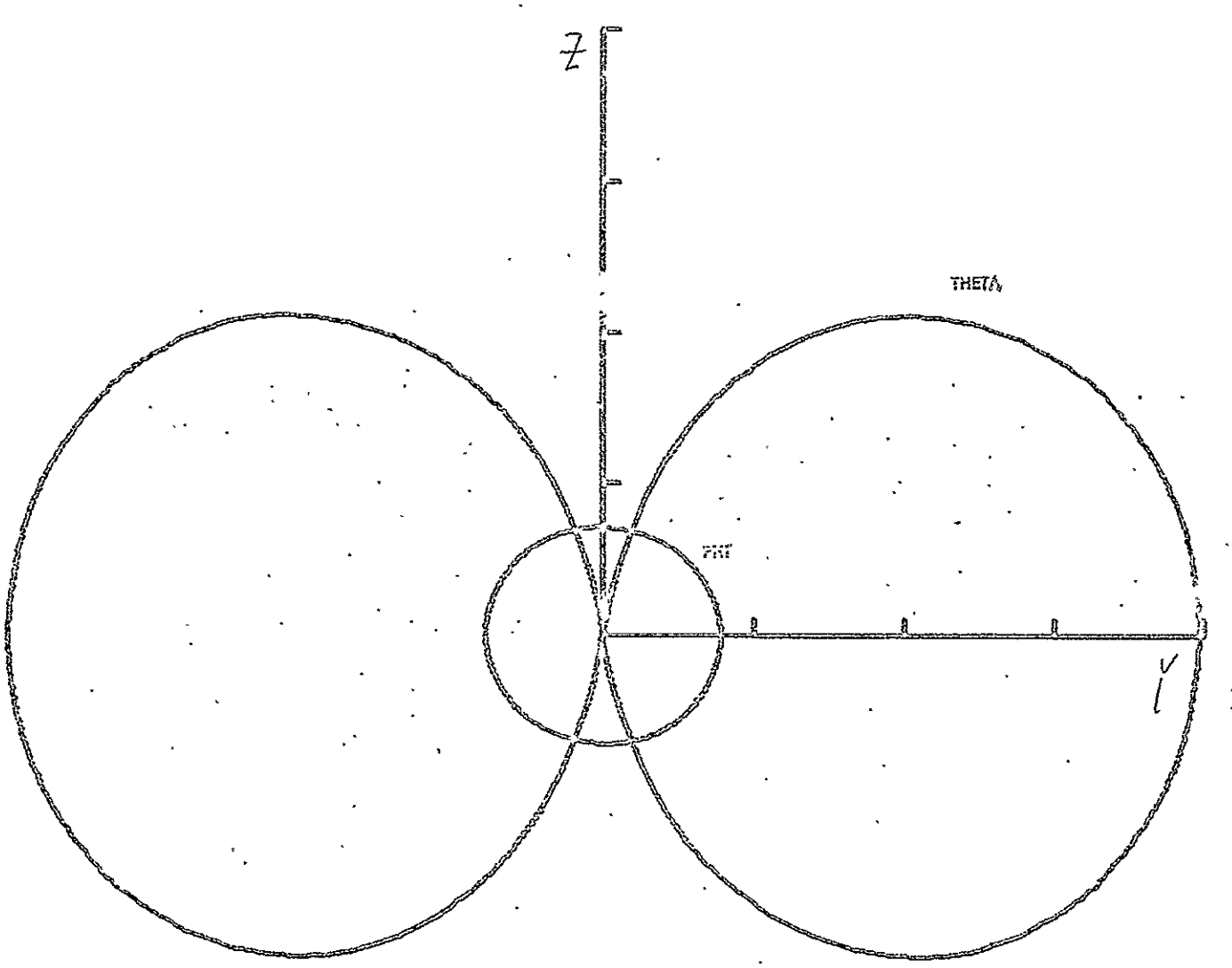

FIGURE B-36

FREQUENCY (MHZ) .900
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX −0.5
DB MIN −20.5

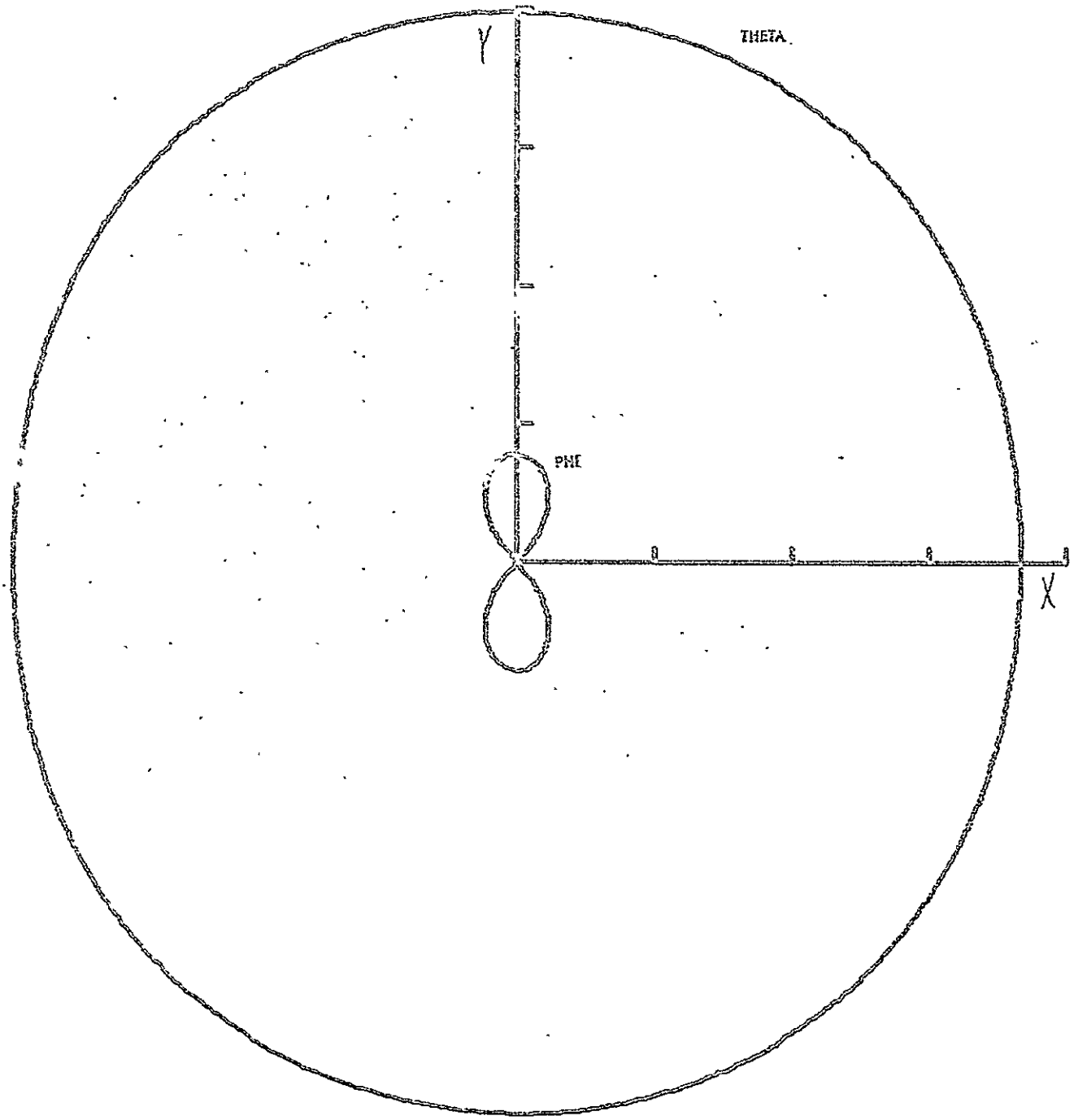

FIGURE B-37

FREQUENCY (MHZ) .900
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX -0.5
DB MIN -20.5

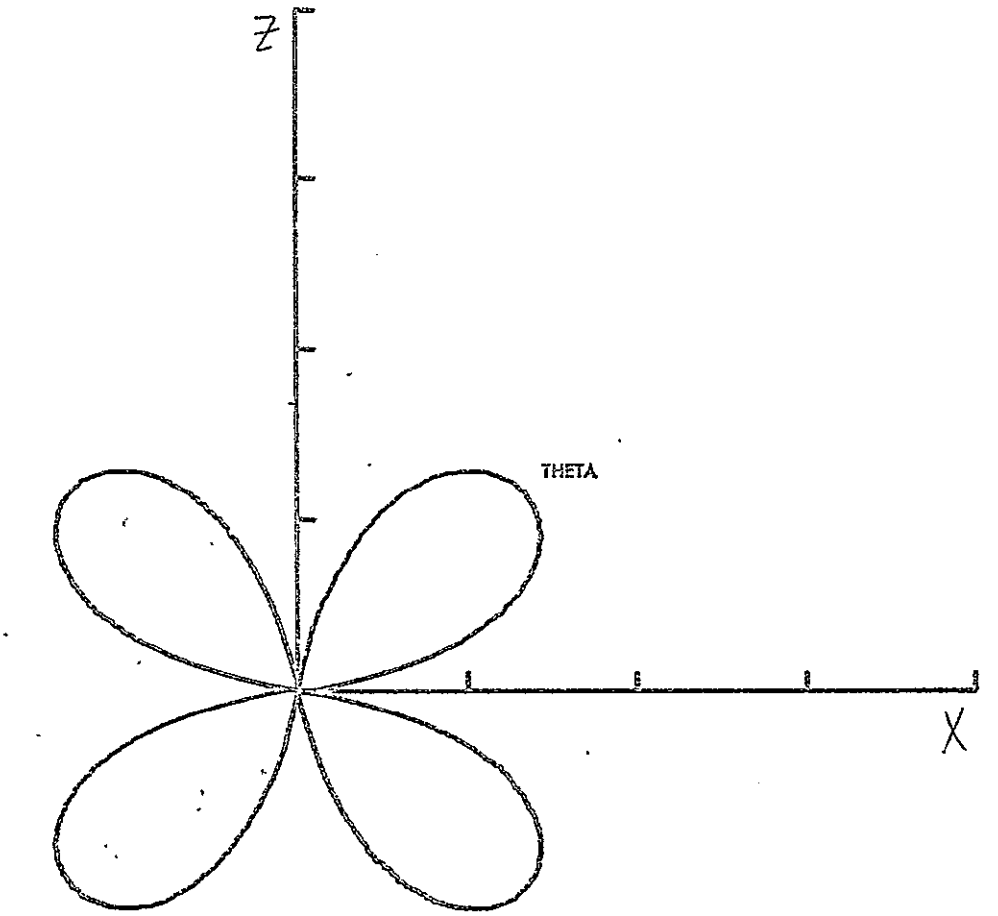

FIGURE B-38

FREQUENCY (MHZ) .900
V-ANT. LENGTH (FT) 950
MODE UNBALANCED
DB MAX −0.5
DB MIN −20.5

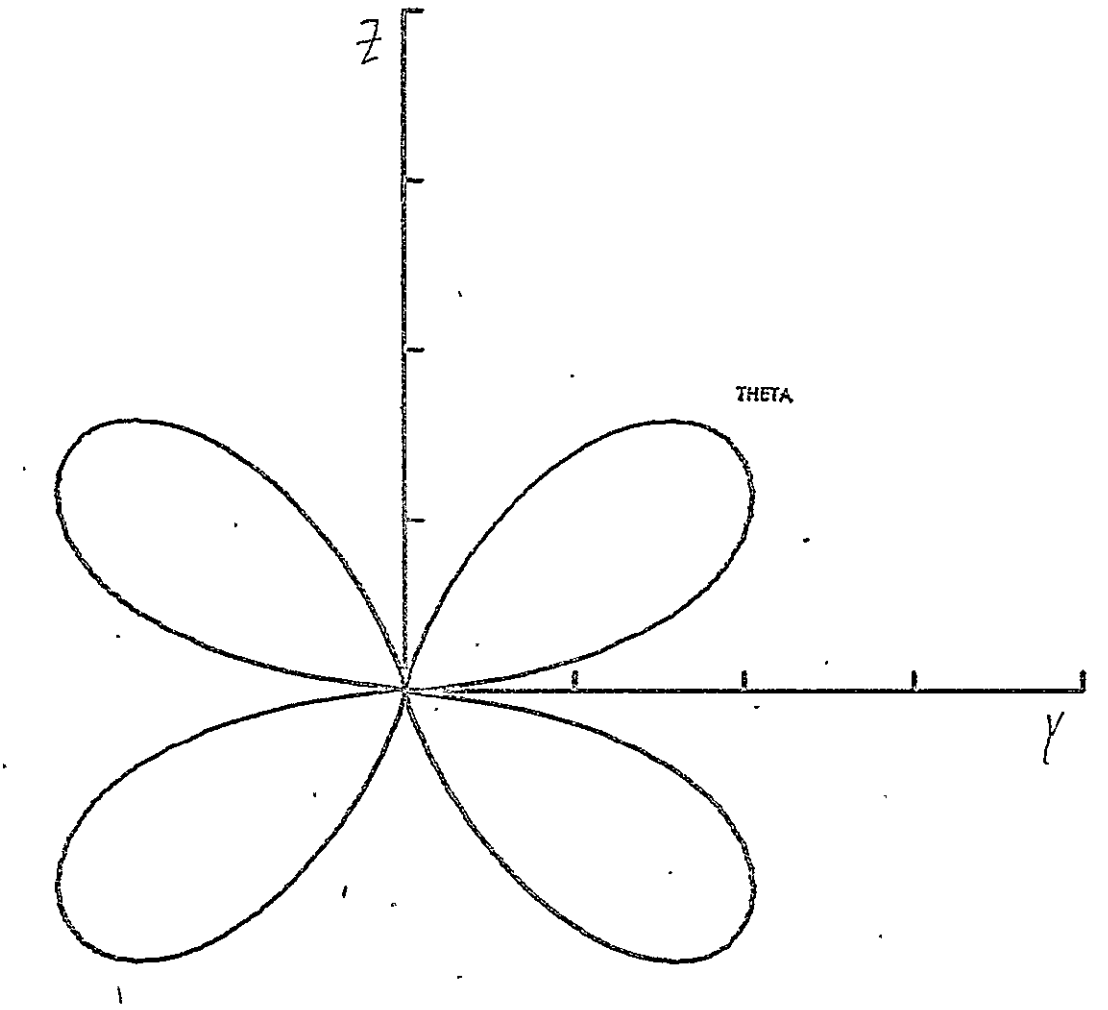

FIGURE B-39

FREQUENCY (MHZ) .900
V-ANT. LENGTH (FT) 950
MODE UNBALANCED
DB MAX −0.5
DB MIN −20.5

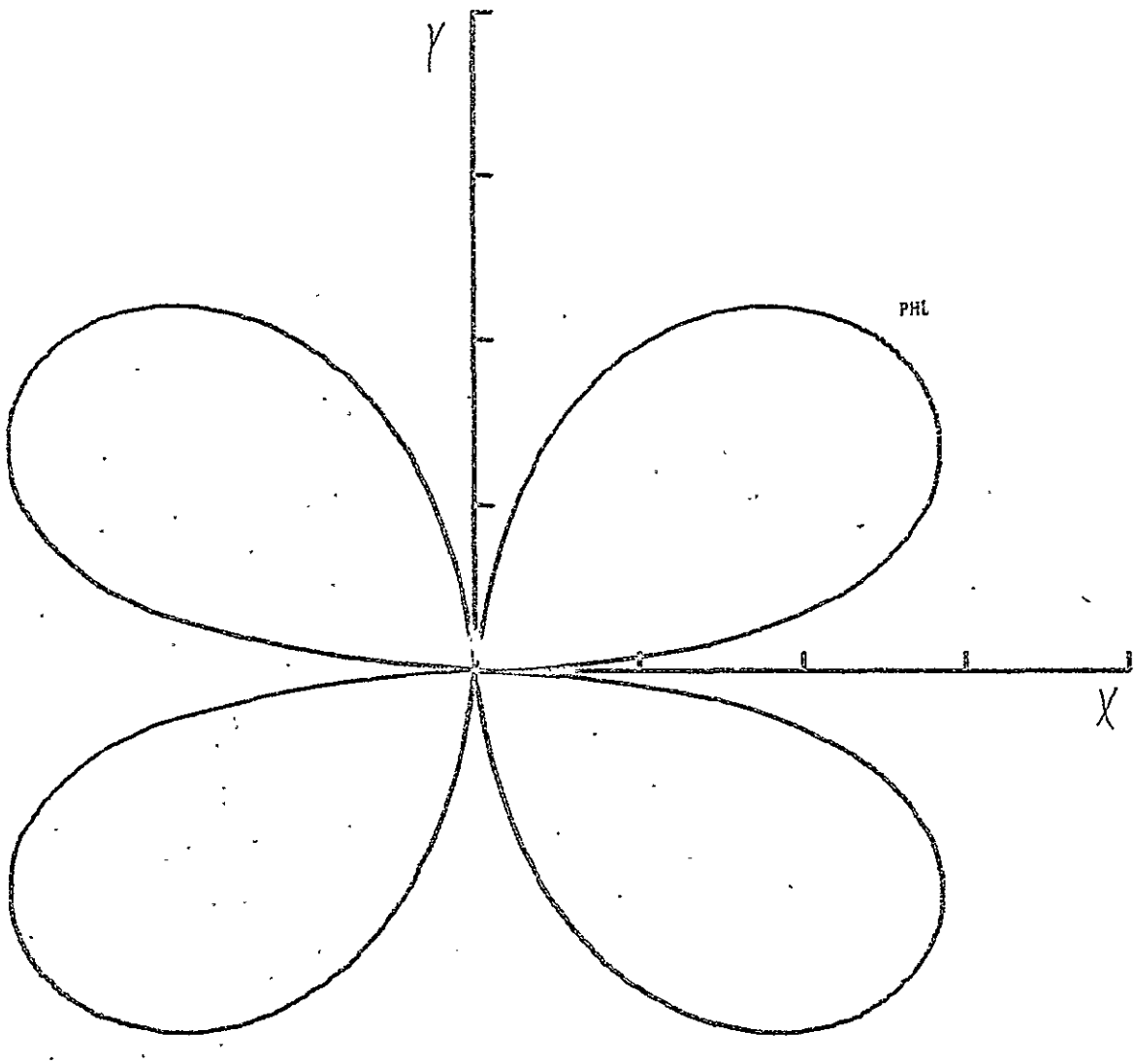

FIGURE B - 40

FREQUENCY (MHZ) .900
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX -0.5
DB MIN -20.5

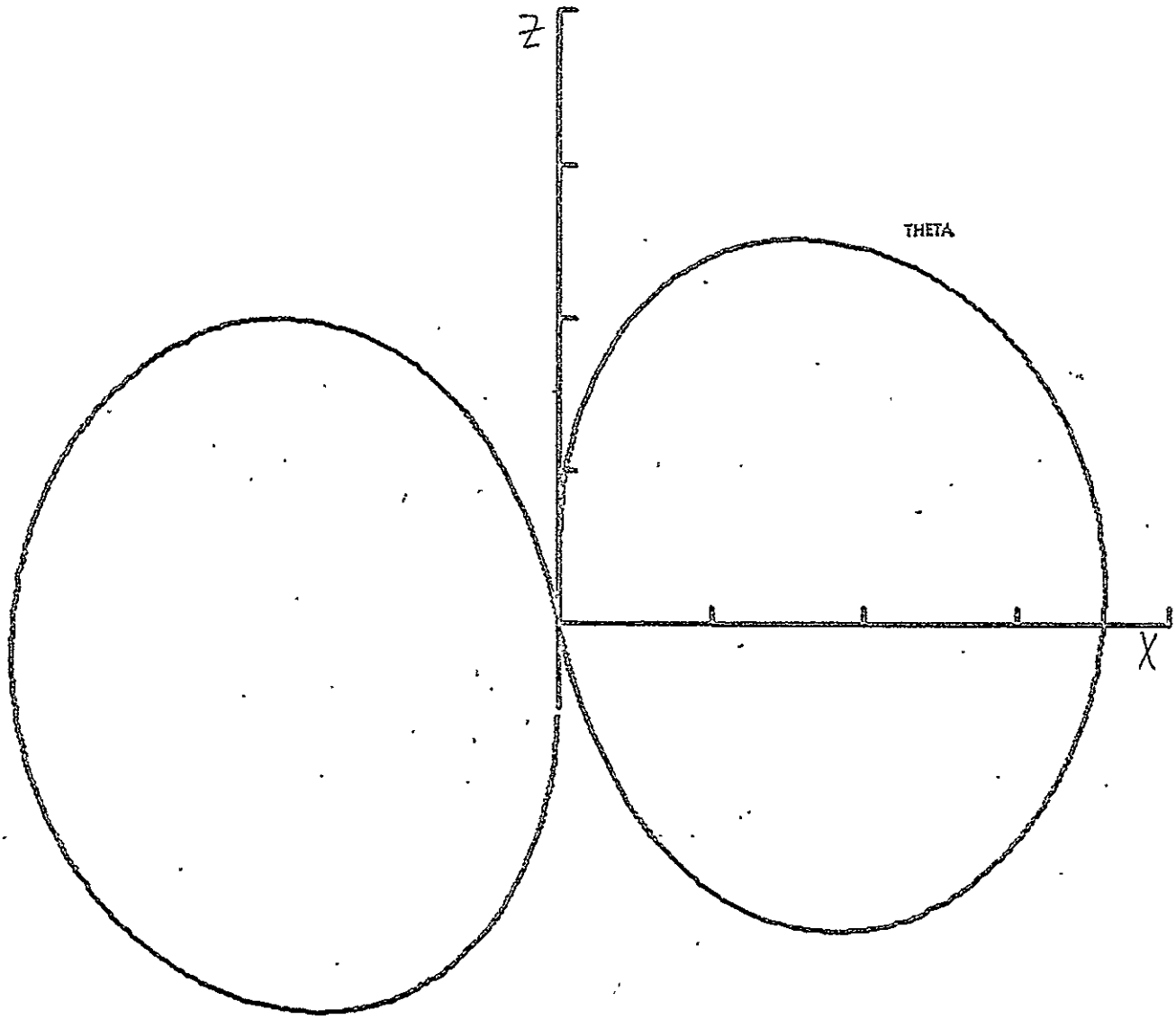

FIGURE B-41

FREQUENCY (MHZ) .995
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB, MAX +0.3
DB MIN -19.7

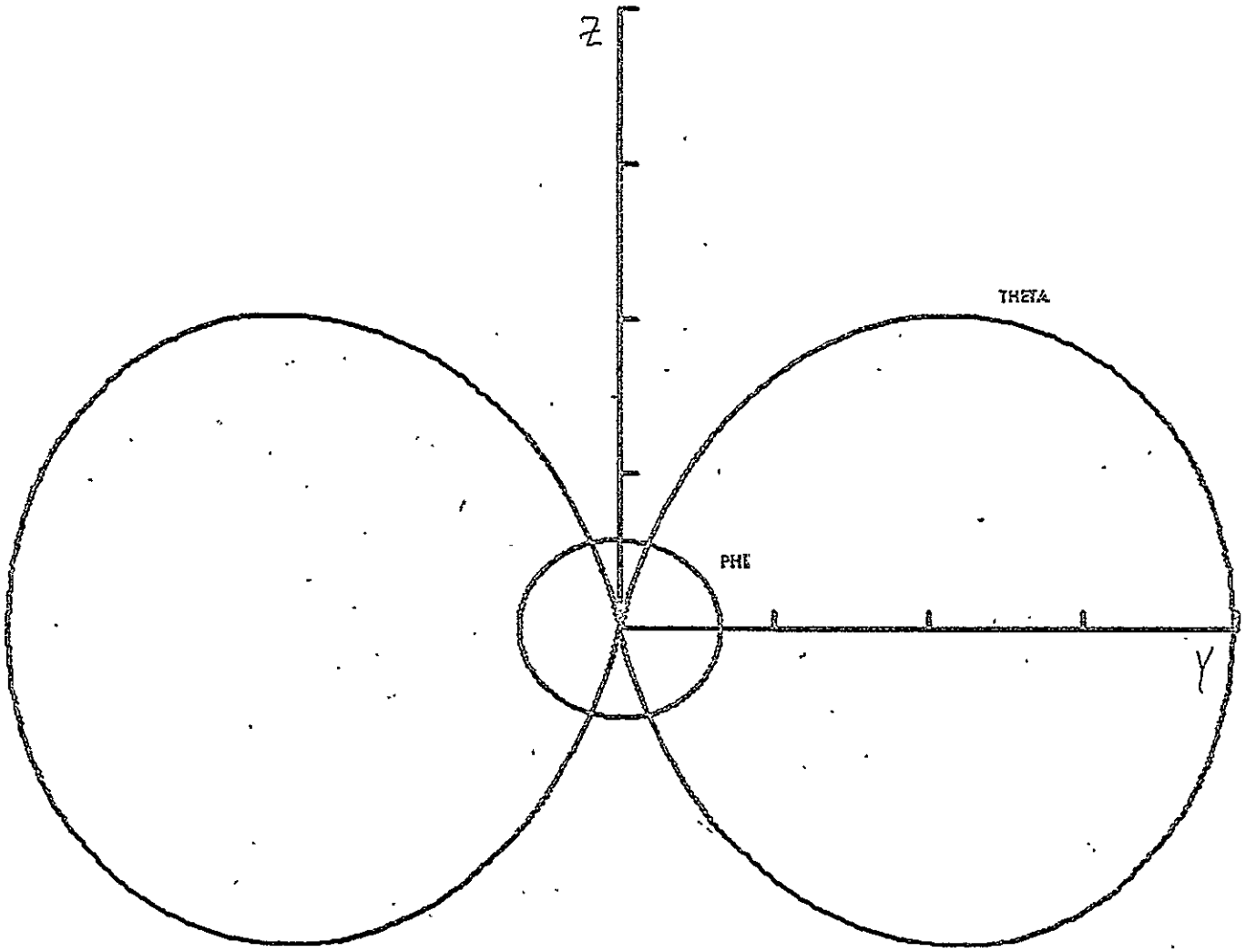

FIGURE B-42

FREQUENCY (MHZ) .995
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX +0.3
DB MIN -19.7

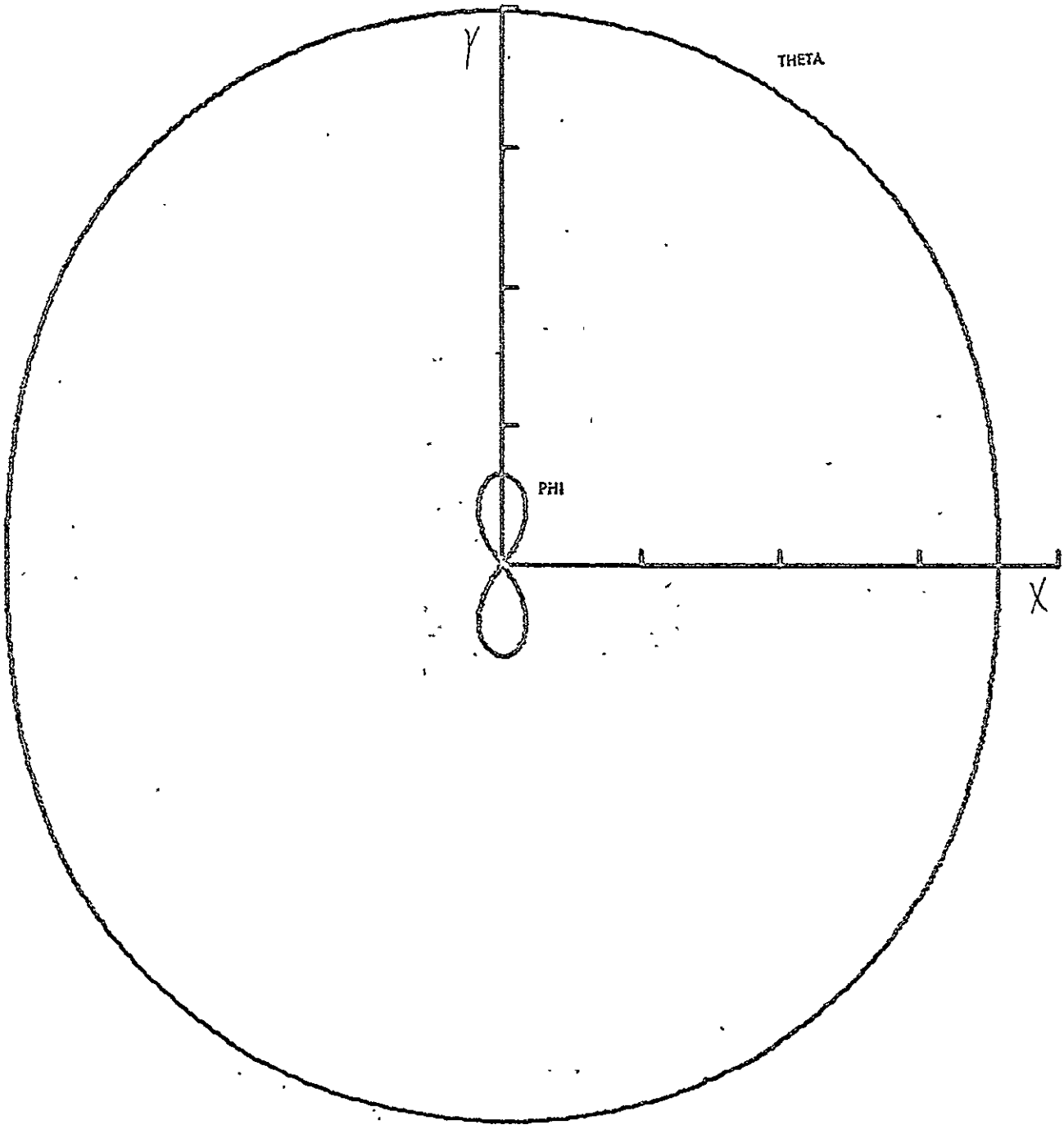

FIGURE B-43

FREQUENCY (MHZ) .995
V-ANT. LENGTH (FT) Y50
MODE BALANCED
DB MAX +0.3
DB MIN -19.7

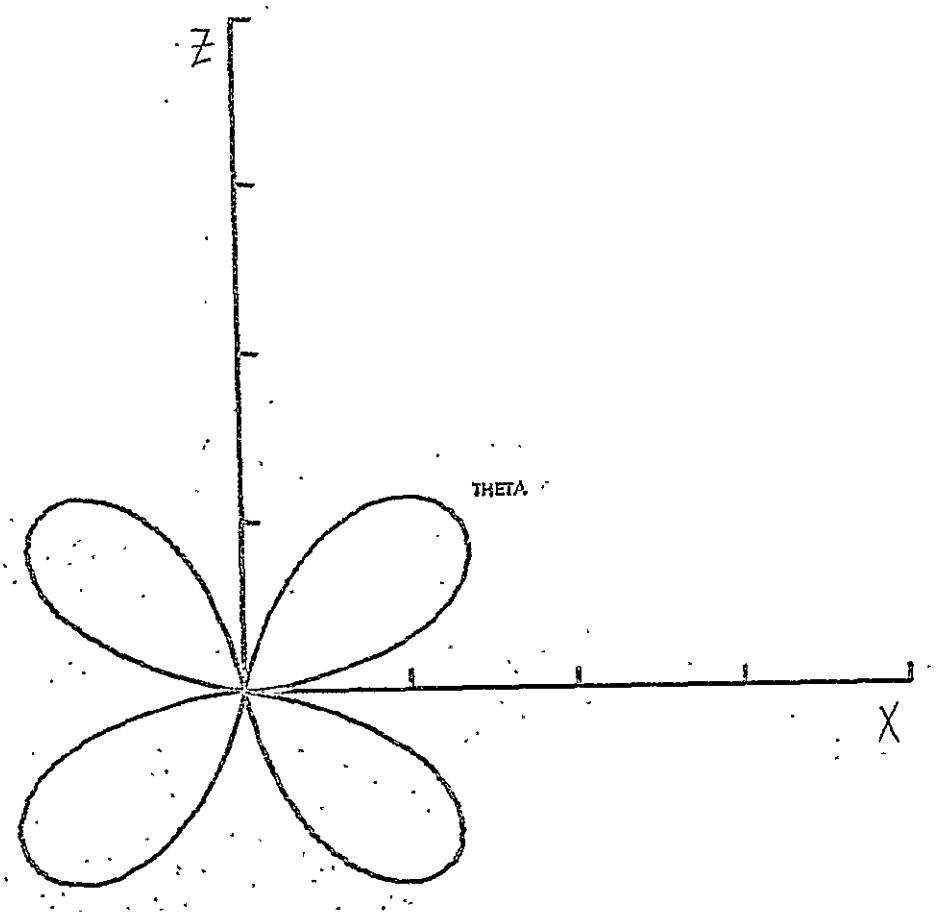

FIGURE B-44

FREQUENCY (MHZ) .995
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX +0.3
DB MIN −19.7

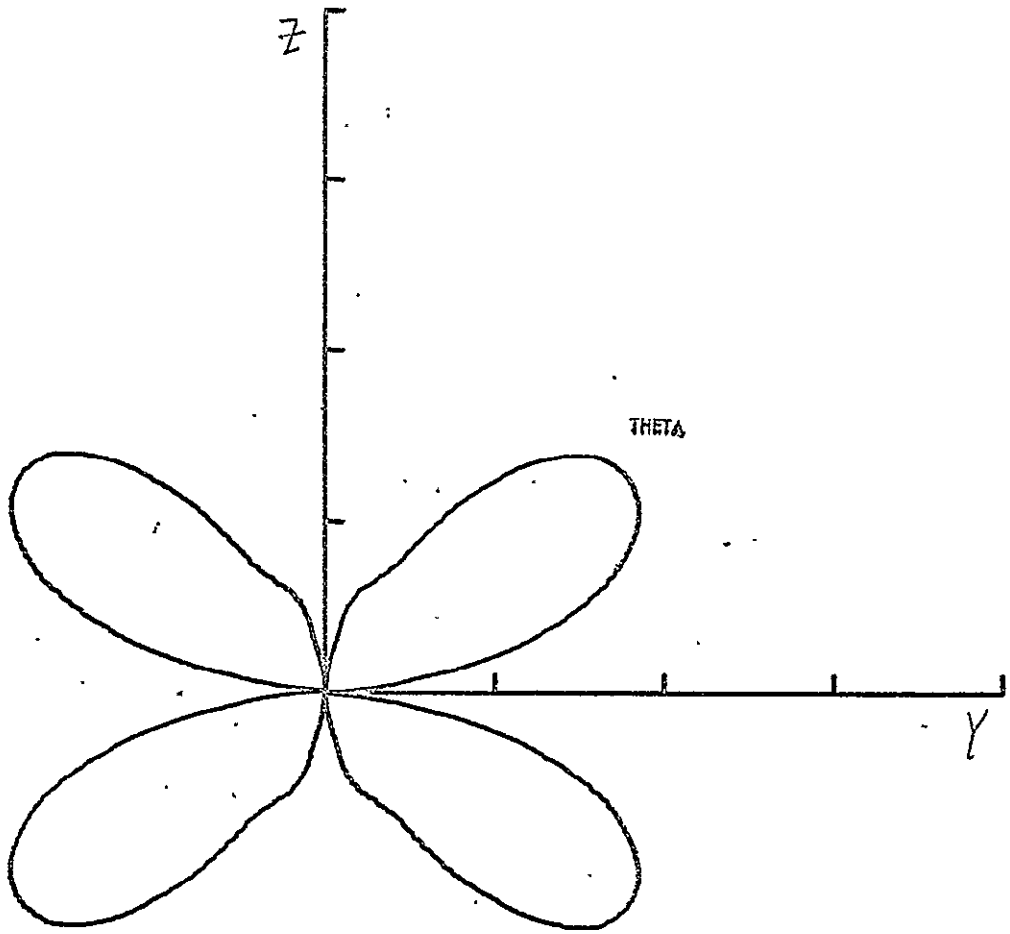

FIGURE B-45

FREQUENCY (MHZ) .995
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX +0.3
DB MIN -19.7

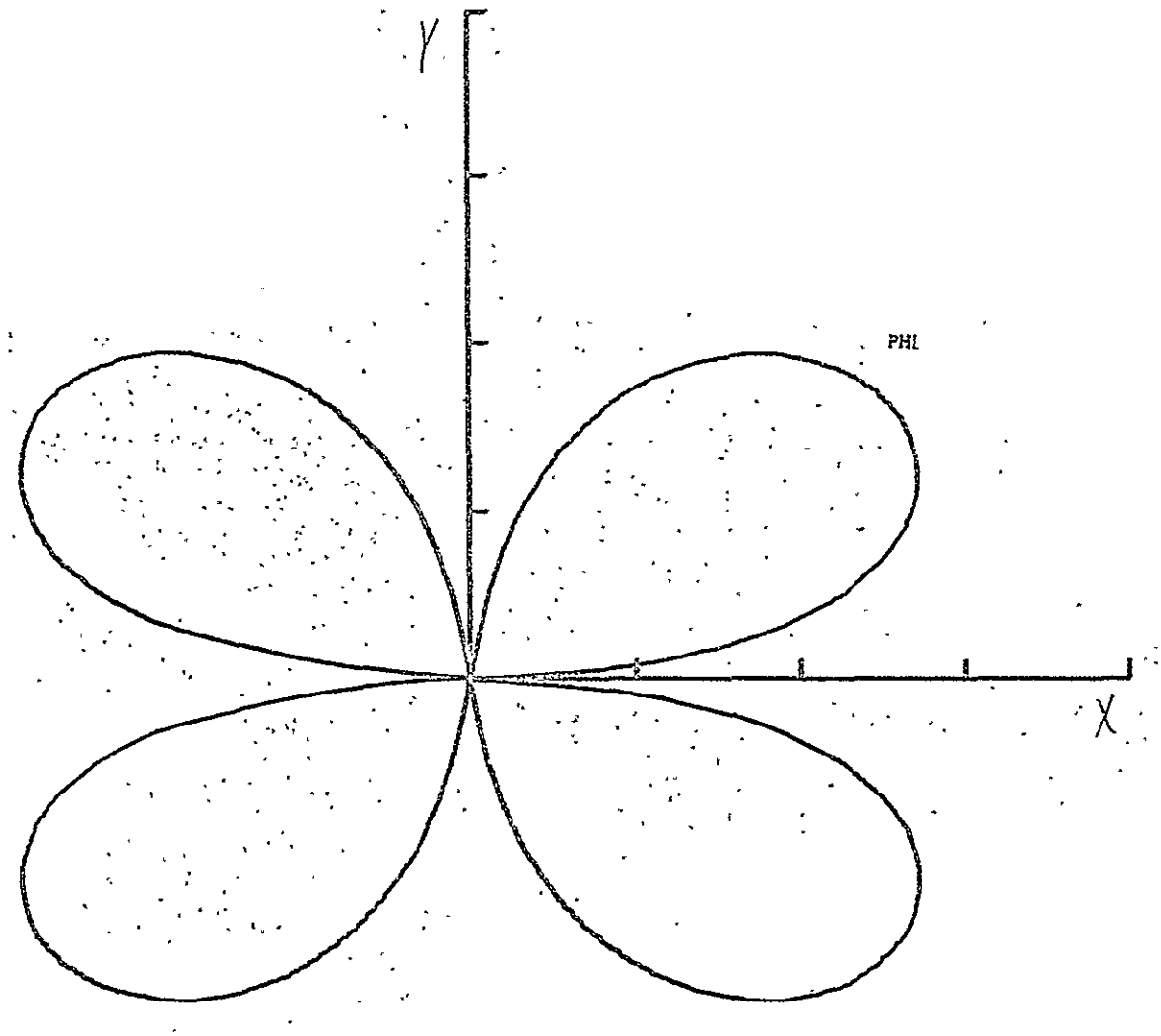

FIGURE B-46

FREQUENCY (MHZ) .995
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX +0.3
DB MIN -19.7

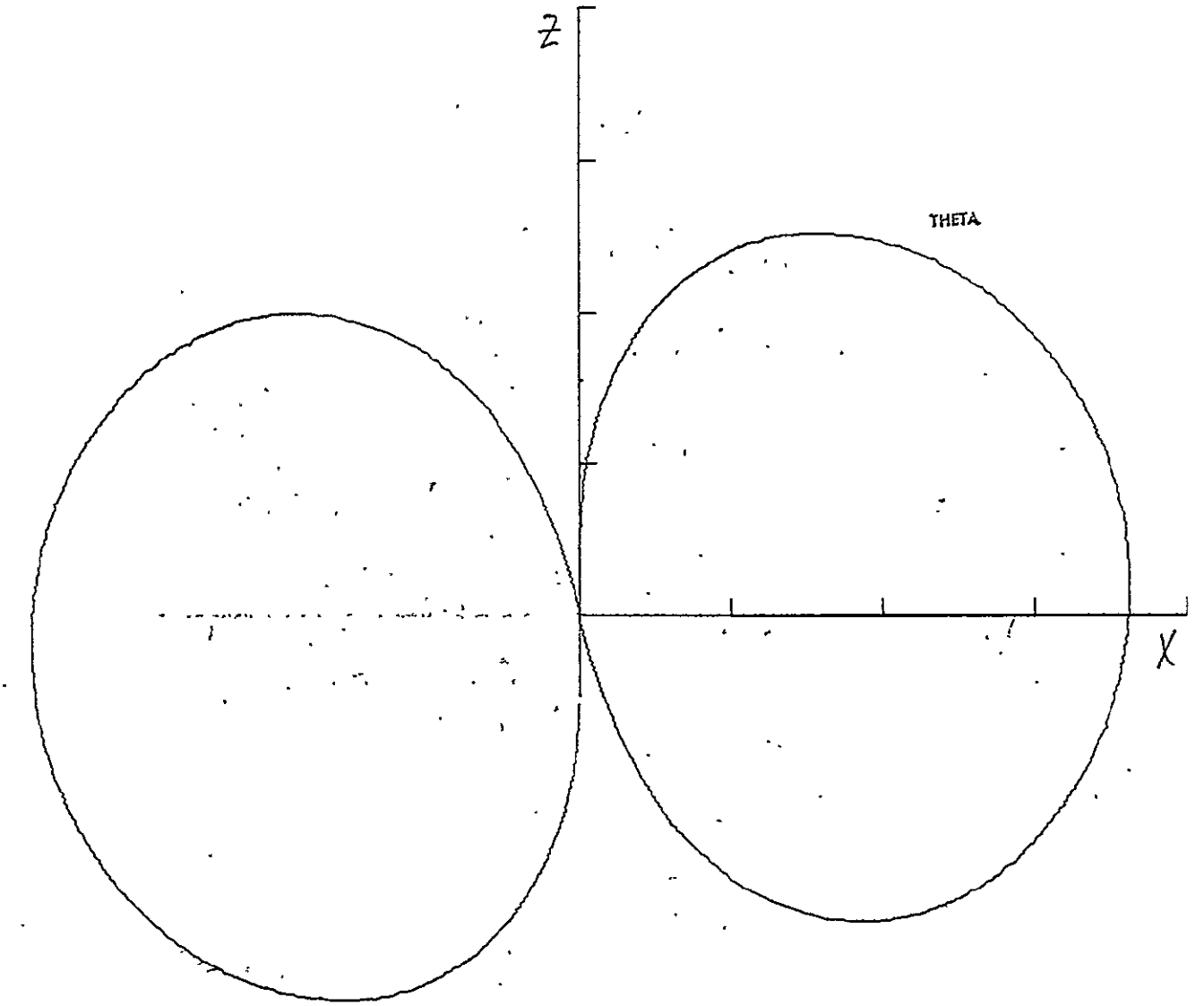

FIGURE B-47

FREQUENCY (MHZ) 1.107
V-ANT. LENGTH (FT) 950
MODE BALANCED
DB MAX +0.5
DB MIN -19.5

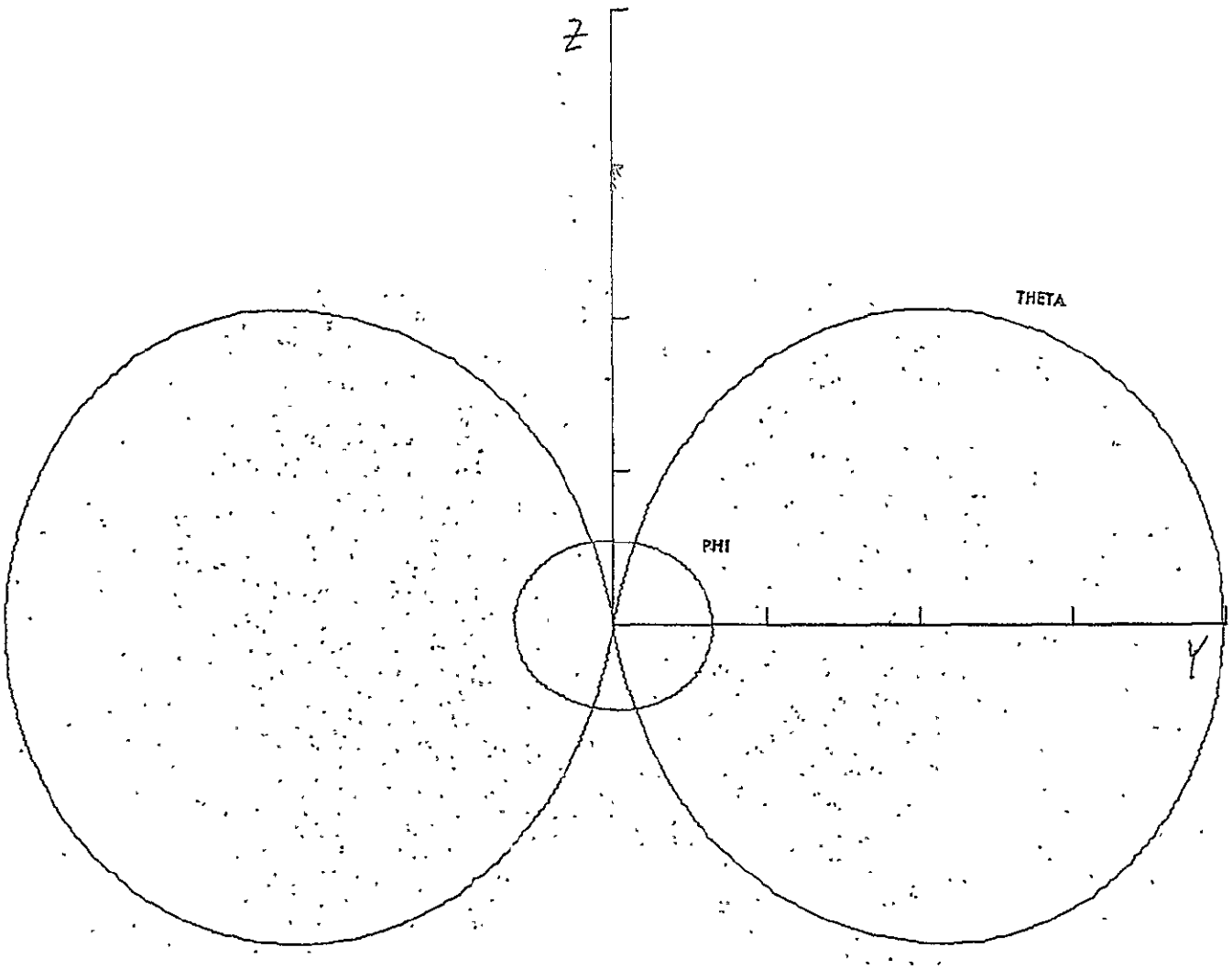

FIGURE B-48

FREQUENCY (MHZ) 1.107
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX +0.5
DB MIN -19.5

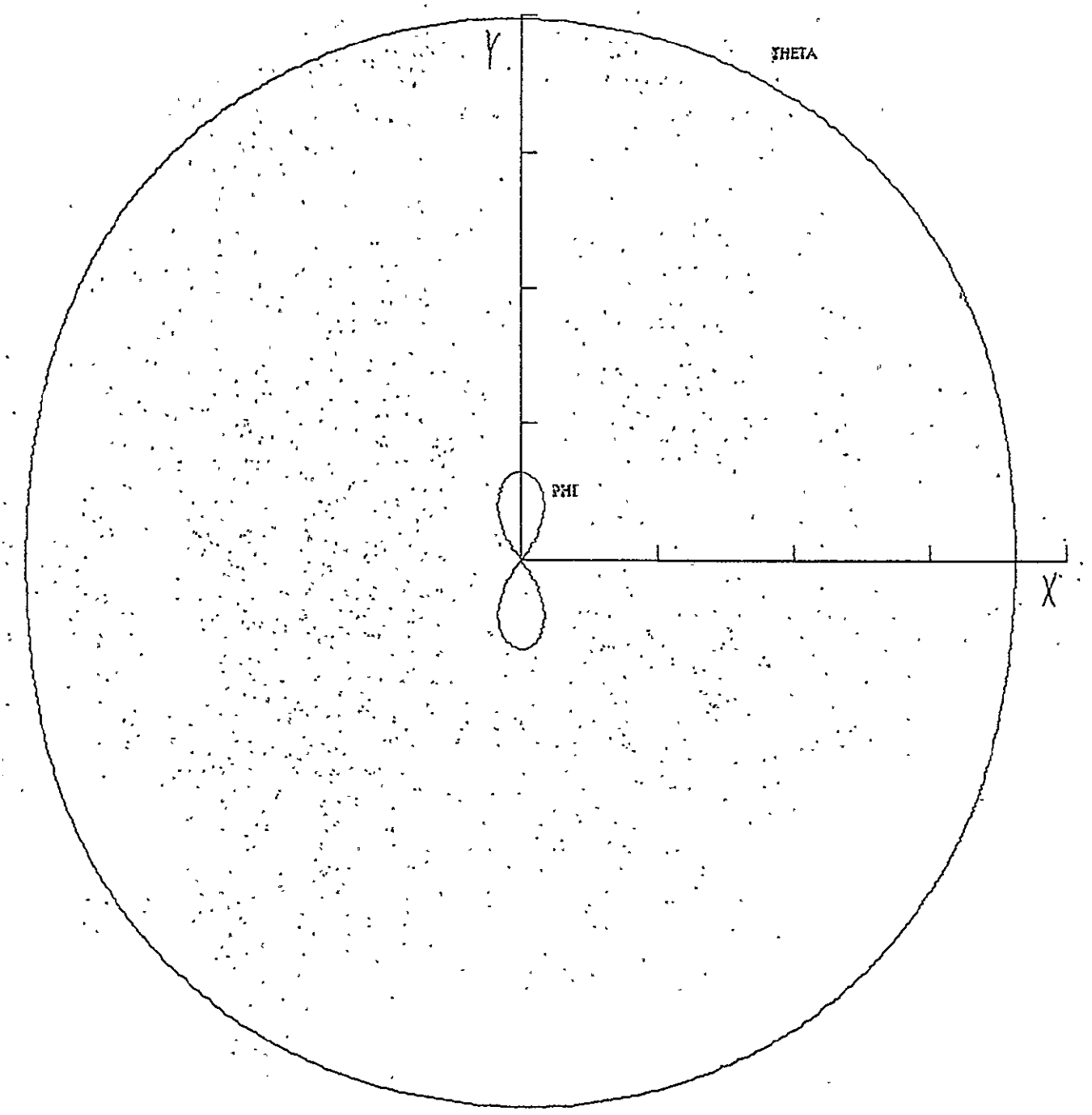

FIGURE B-49

FREQUENCY (MHZ) 1.107
Y-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX +0.5
DB MIN −19.5

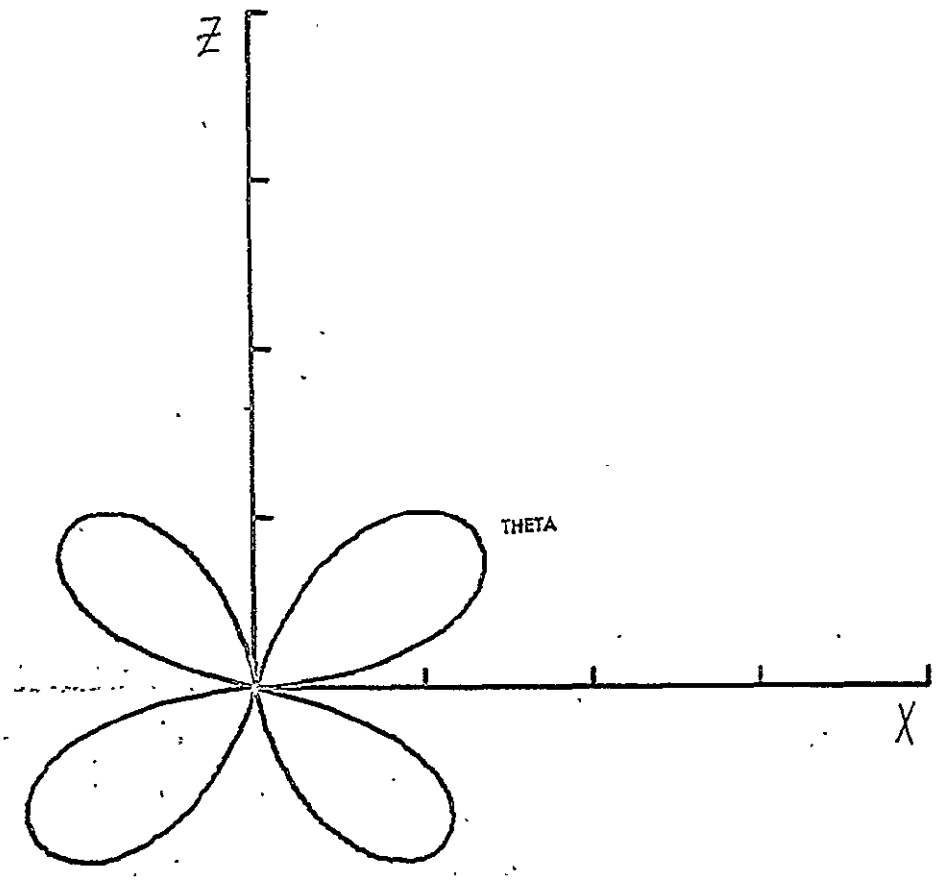

FIGURE B-50
FREQUENCY (MHZ) 1.107
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX +0.5
DB MIN −19.5

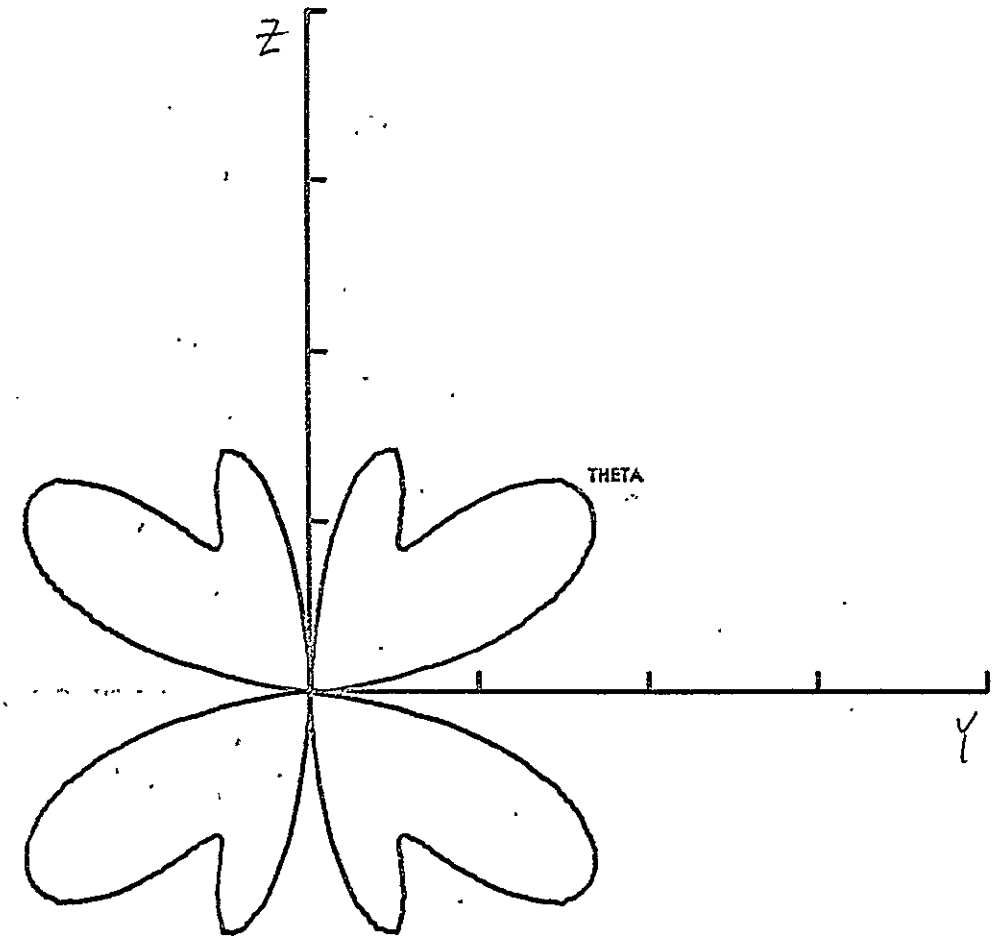

FIGURE B-51
FREQUENCY (MHZ) 1.107
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX +0.5
DB MIN -19.5

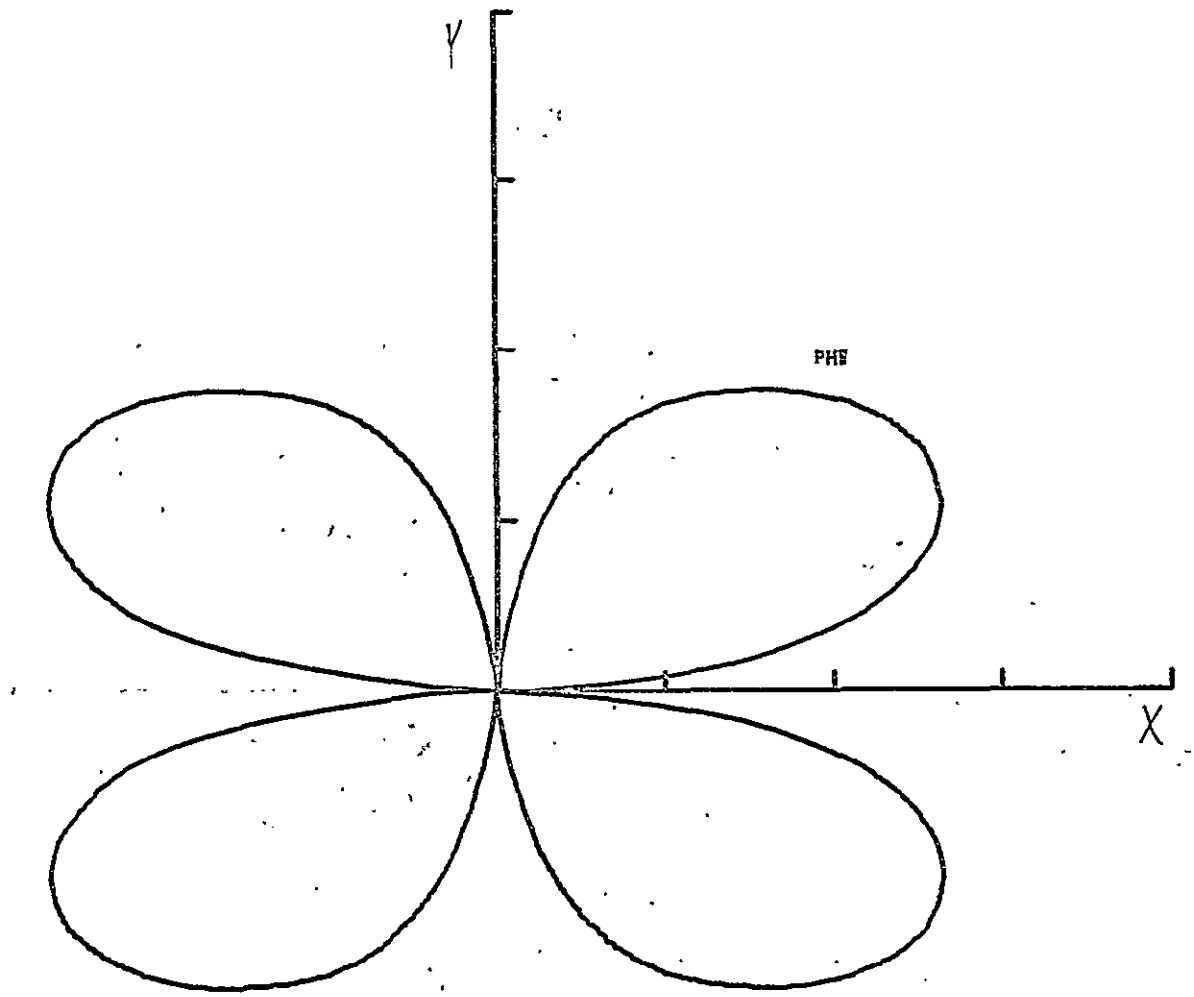

FIGURE B-52

FREQUENCY (MHZ) 1.107
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX +0.5
DB MIN -19.5

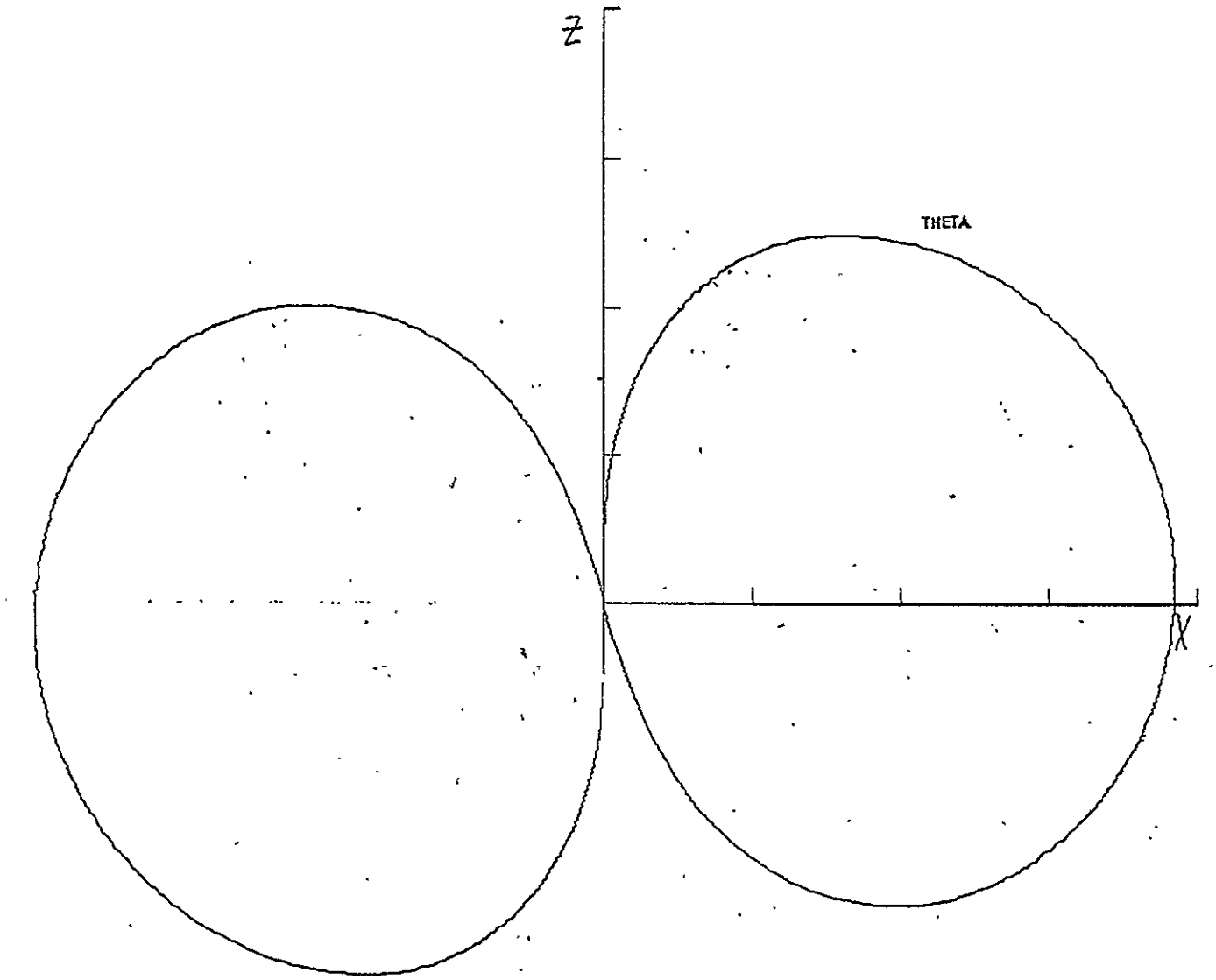

FIGURE B-53
FREQUENCY (MHZ) 1.31
V-ANT. LENGTH (FT) 950
MODE BALANCED
DB MAX +0.7
DB MIN -19.3

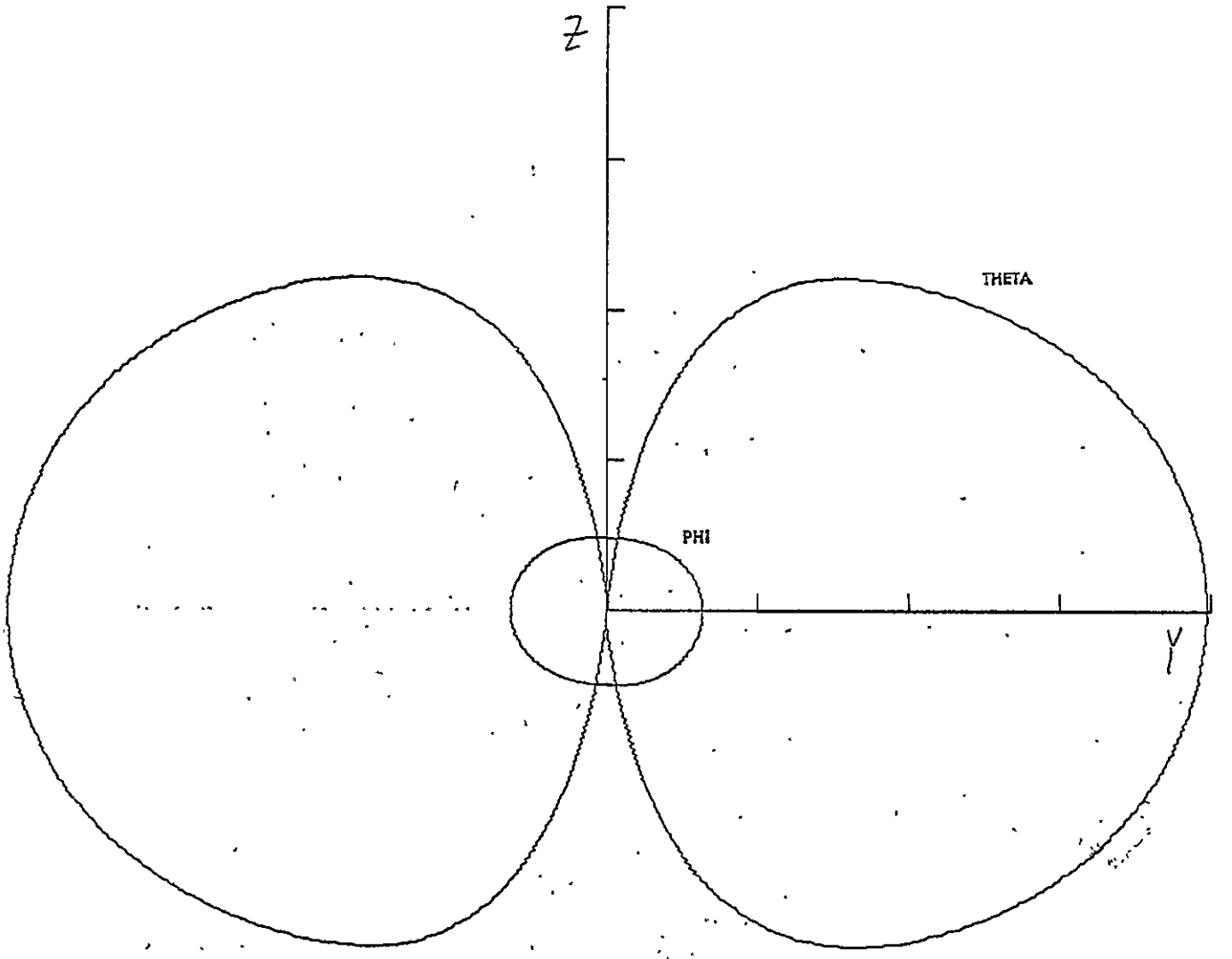

FIGURE B-54

FREQUENCY (MHZ) 1.31
V-ANT. LENGTH (FT) 750
MODE · BALANCED
DB MAX +0.7
DB MIN -19.3

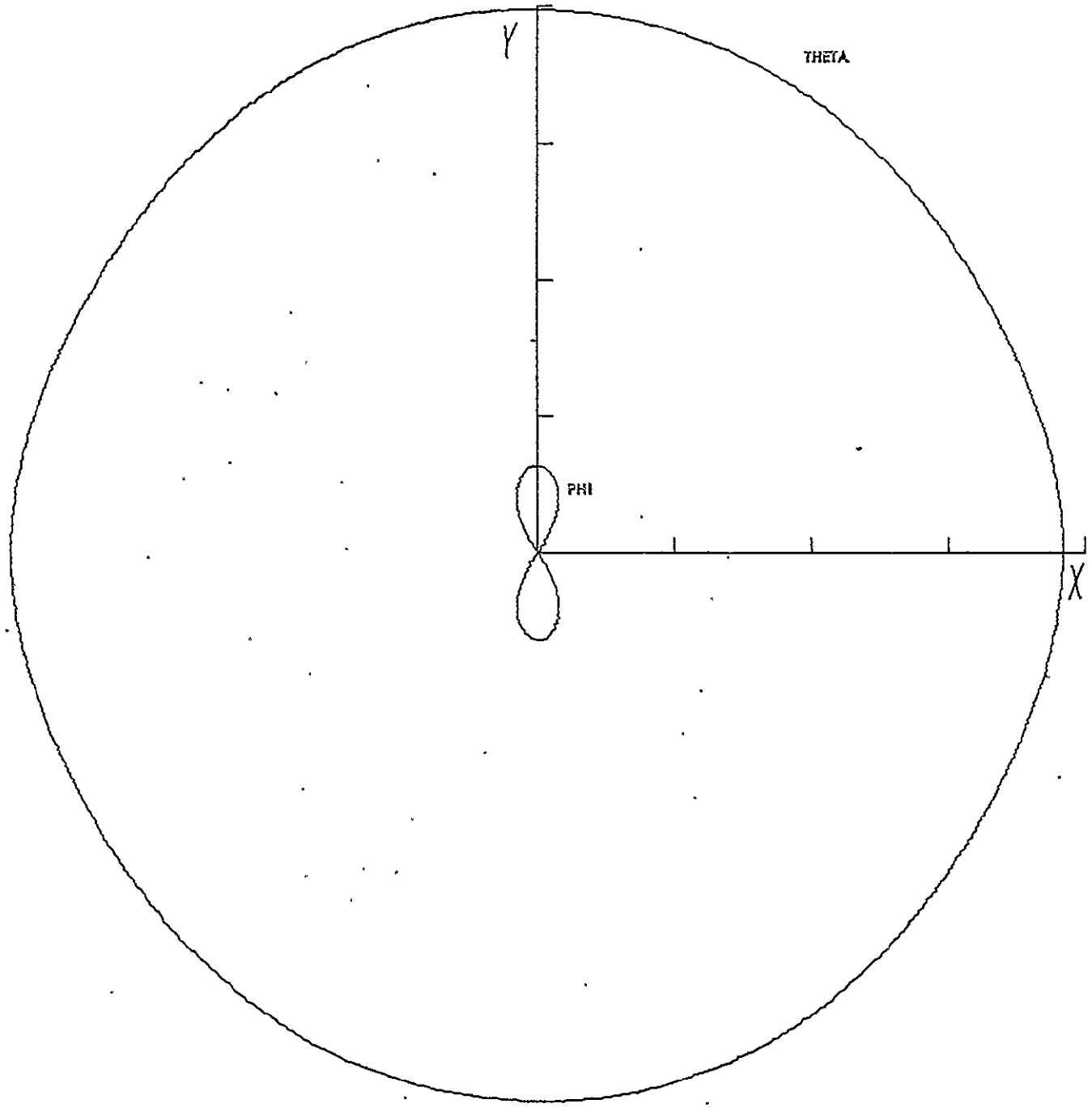

FIGURE B-55

FREQUENCY (MHZ) 1.31
Y-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX +0.7
DB MIN −19.3

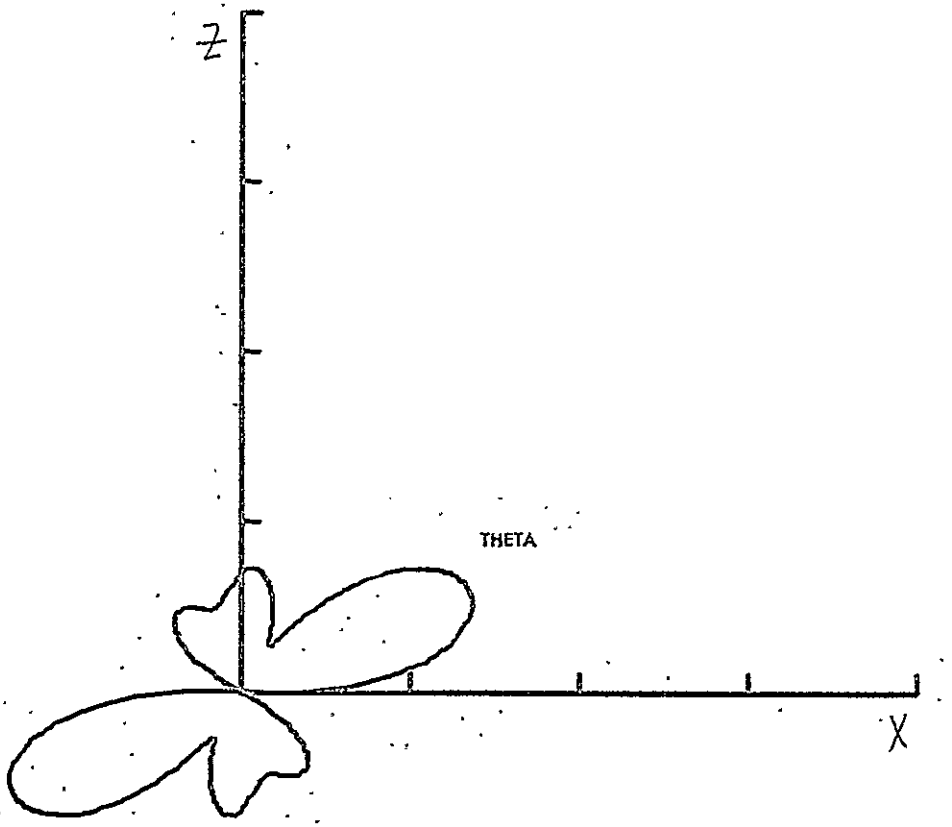

FIGURE B-56
FREQUENCY (MHZ) 1.31
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX +0.7
DB MIN -19.3

D

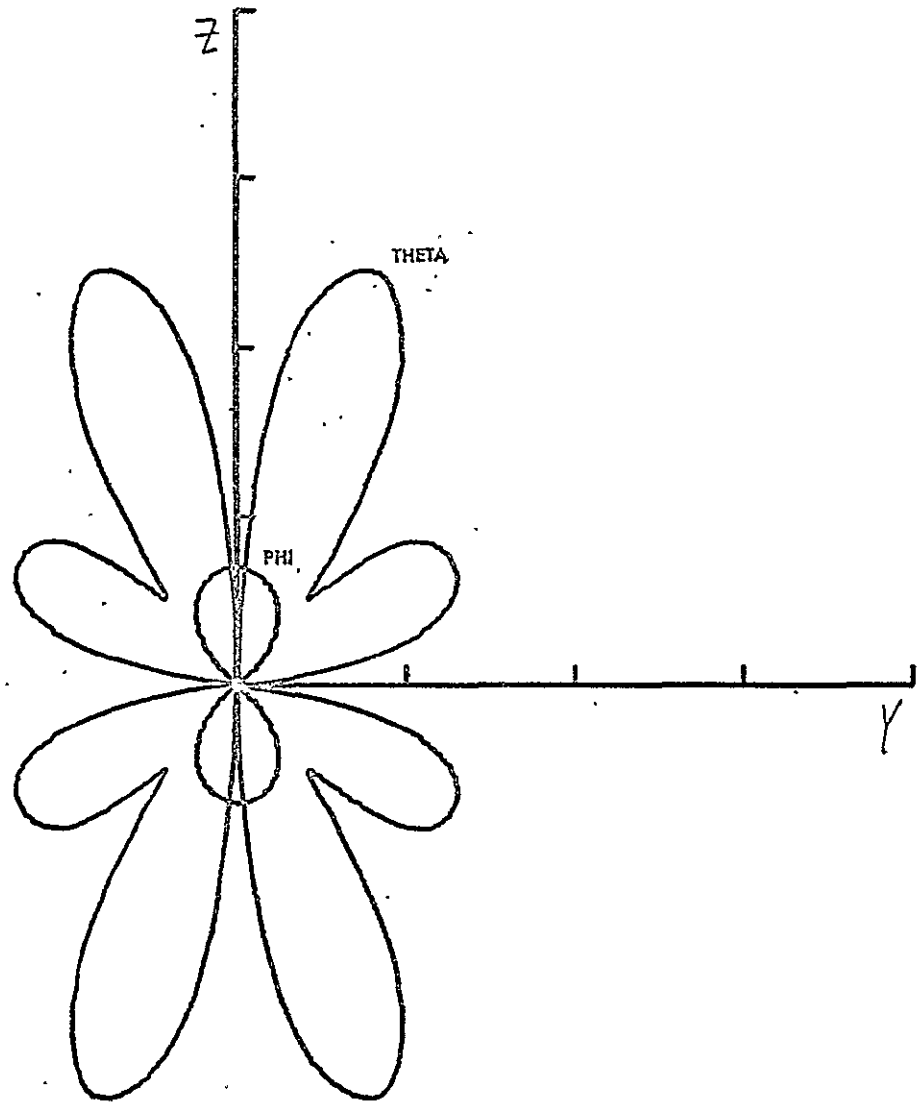

FIGURE B-57

FREQUENCY (MHZ) 1.31
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX +0.7
DB MIN -19.3

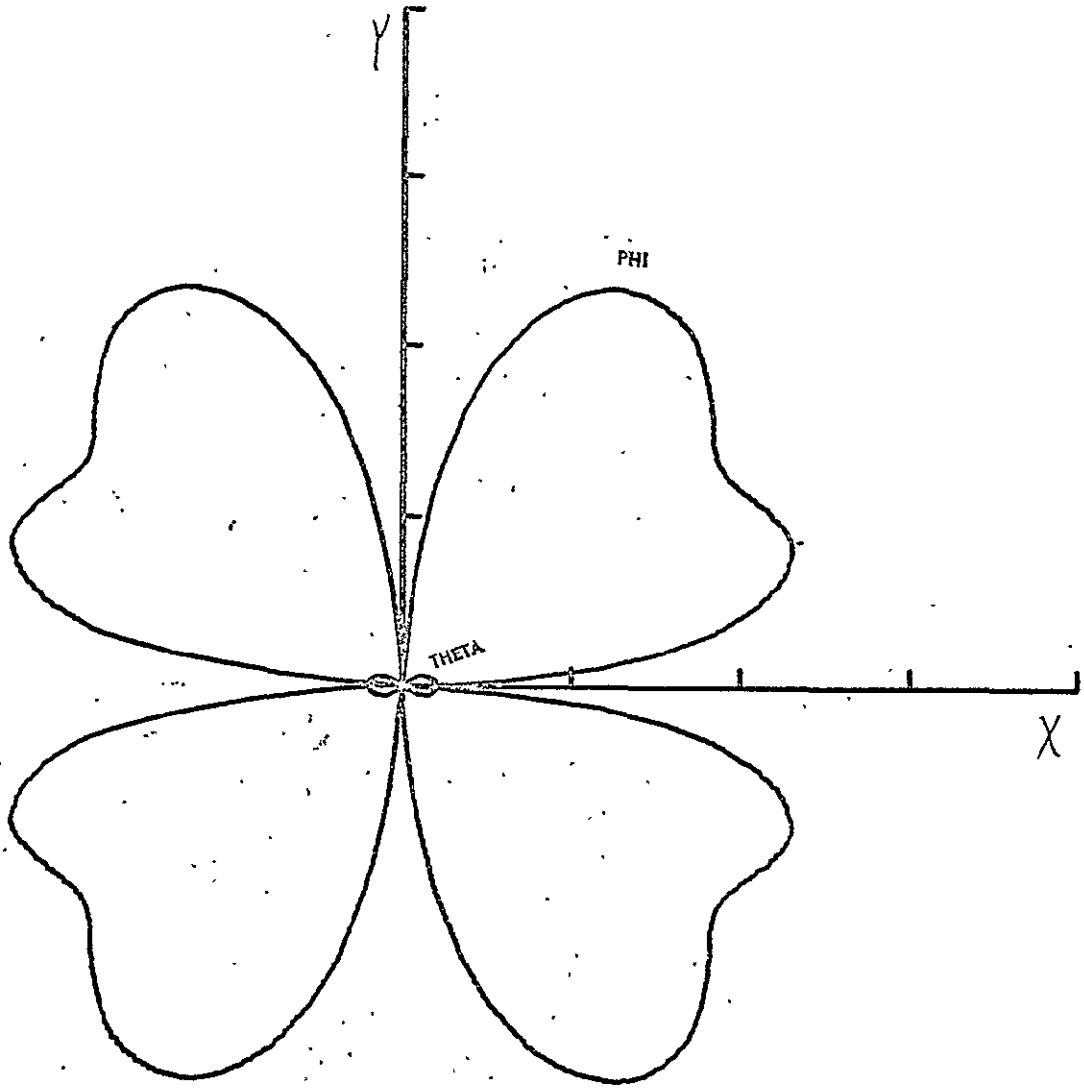

FIGURE B-58

FREQUENCY (MHZ) 1.31
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX +0.7
DB MIN −19.3

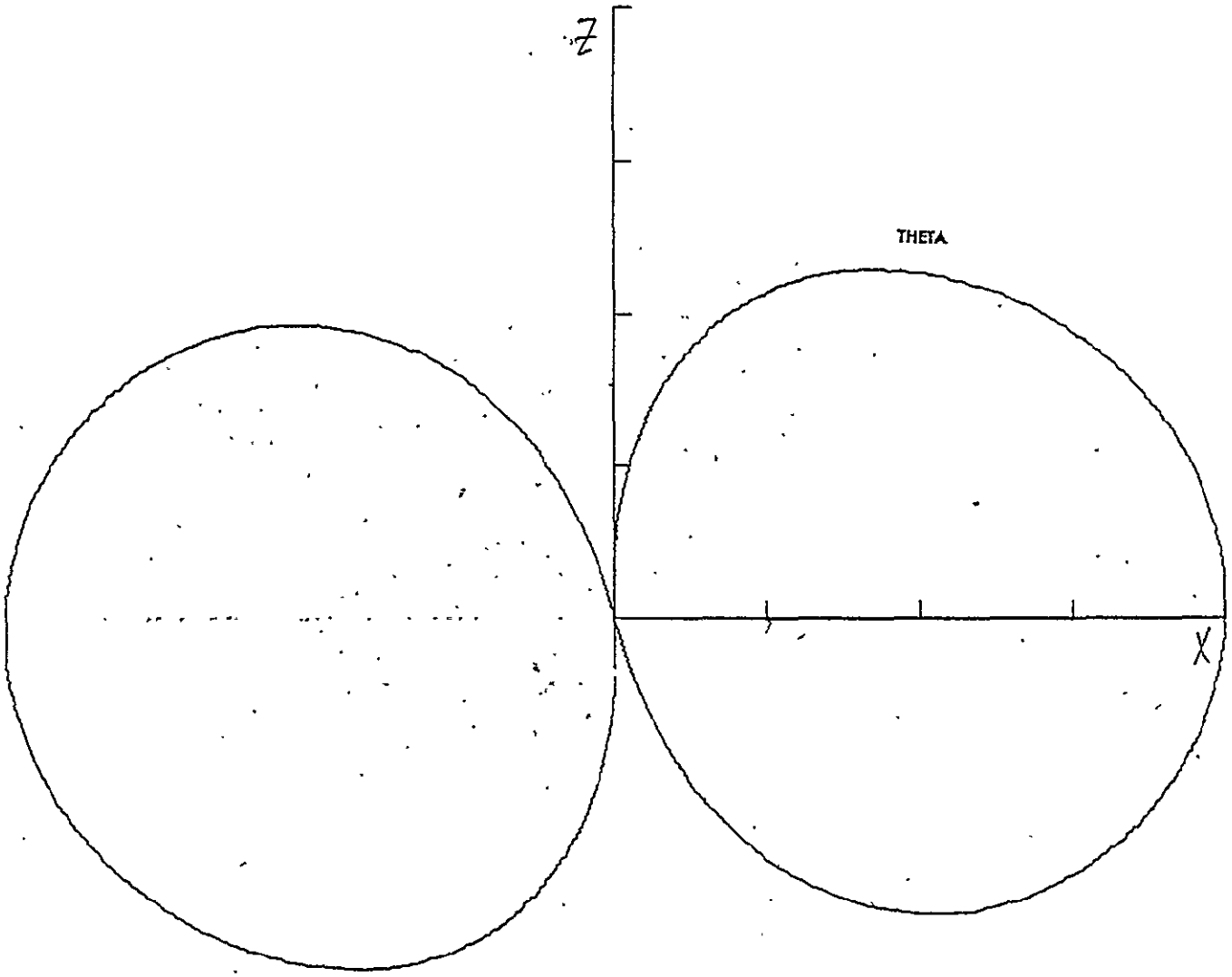

FIGURE B-59

FREQUENCY (MHZ) 1.65
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX +1.3
DB MIN -18.7

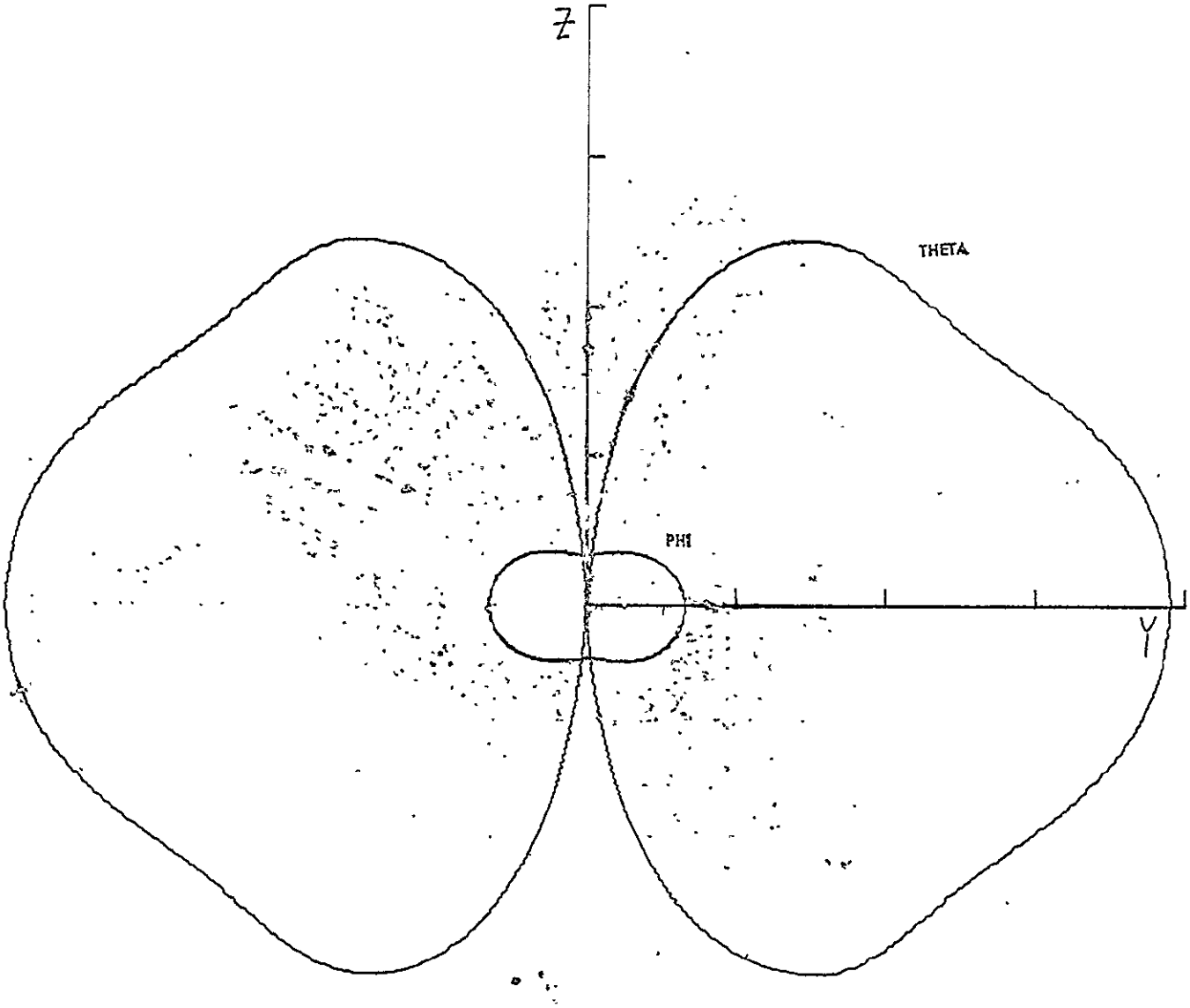

FIGURE B-60
FREQUENCY (MHZ) 1.65
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX +1.3
DB MIN −18.7

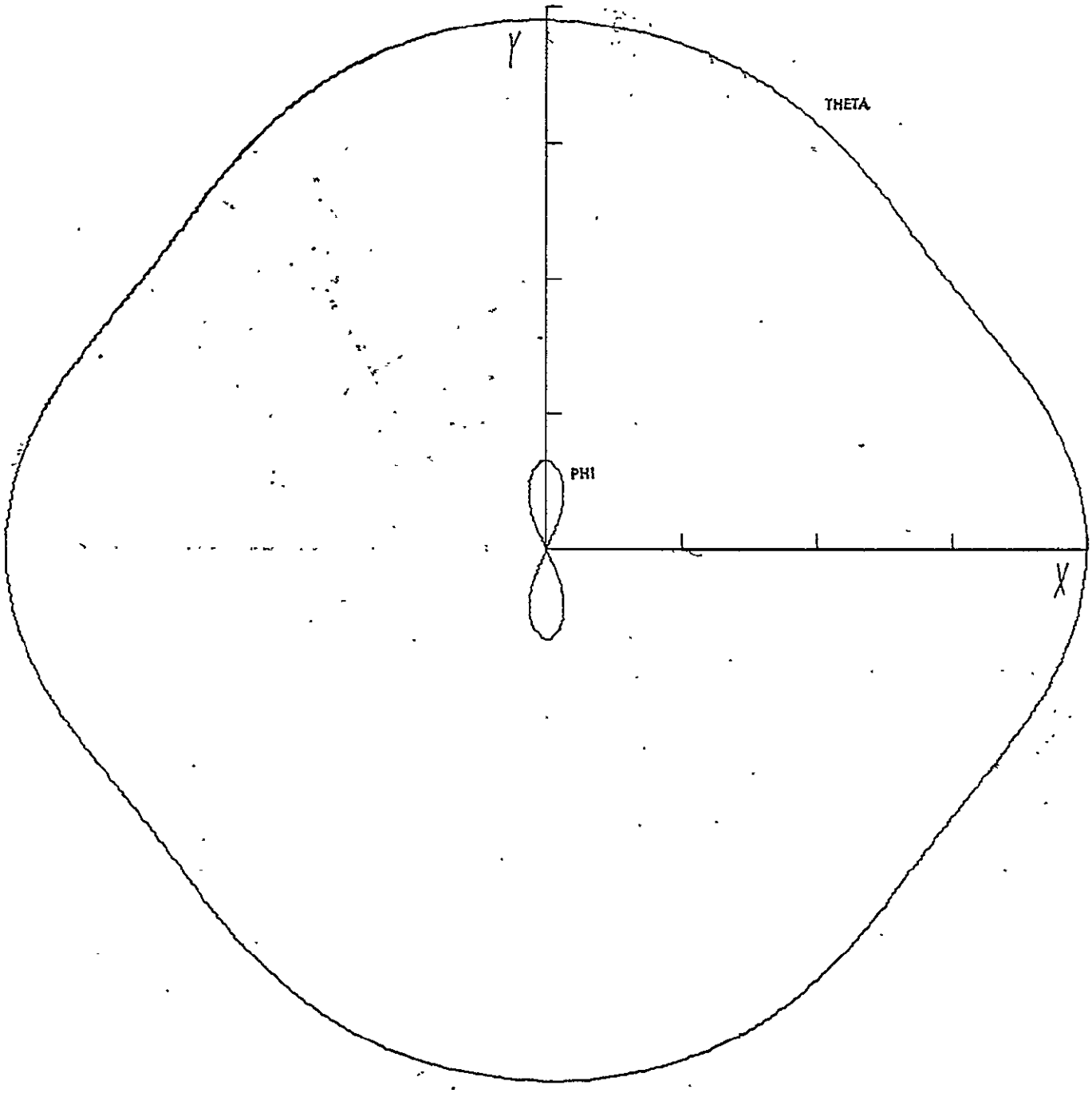

FIGURE B-61

FREQUENCY (MHZ) 1.65
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX +1.3
DB MIN -18.7

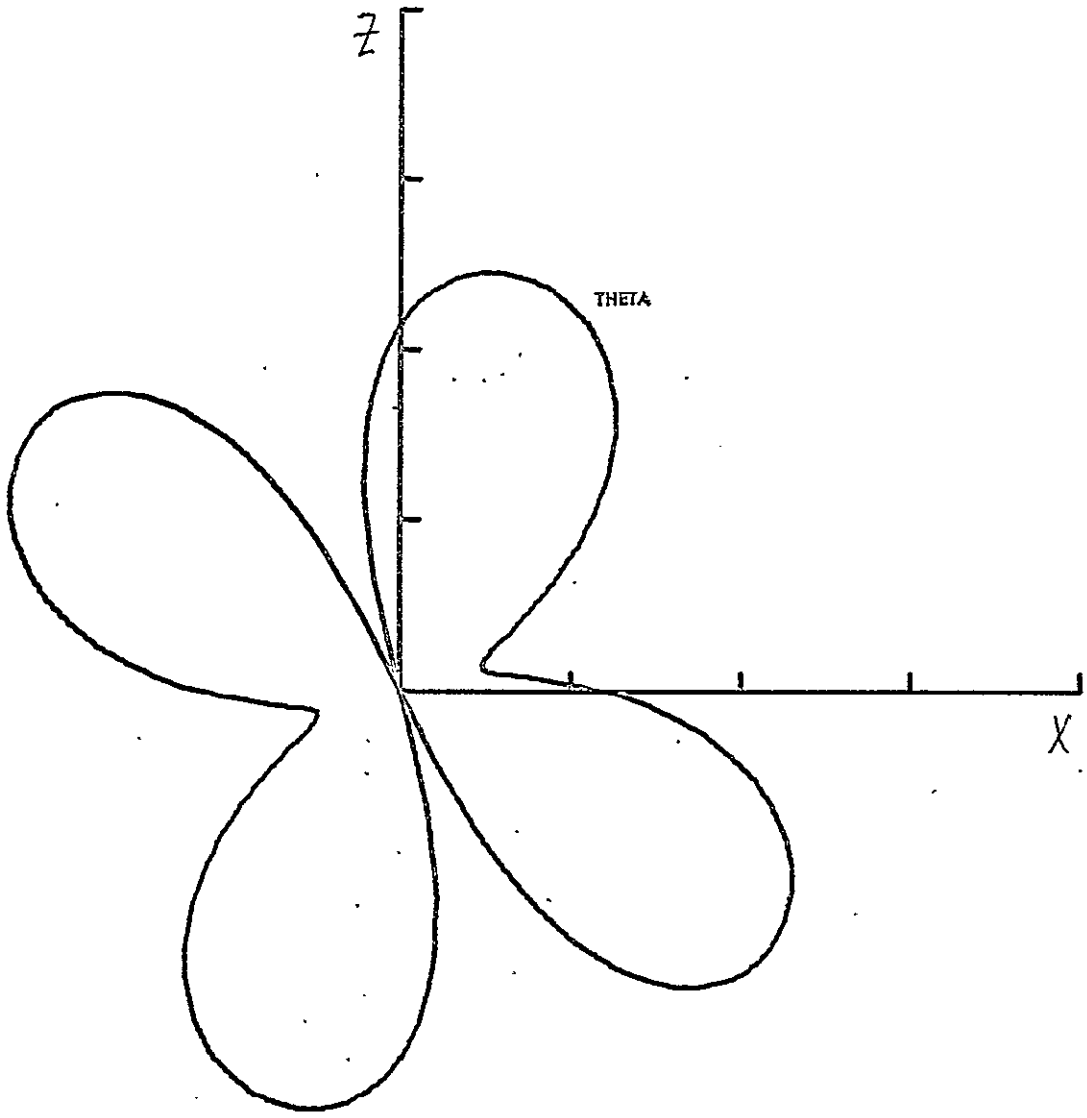

FIGURE B-62
FREQUENCY (MHZ) 1.65
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX +1.3
DB MIN -18.7

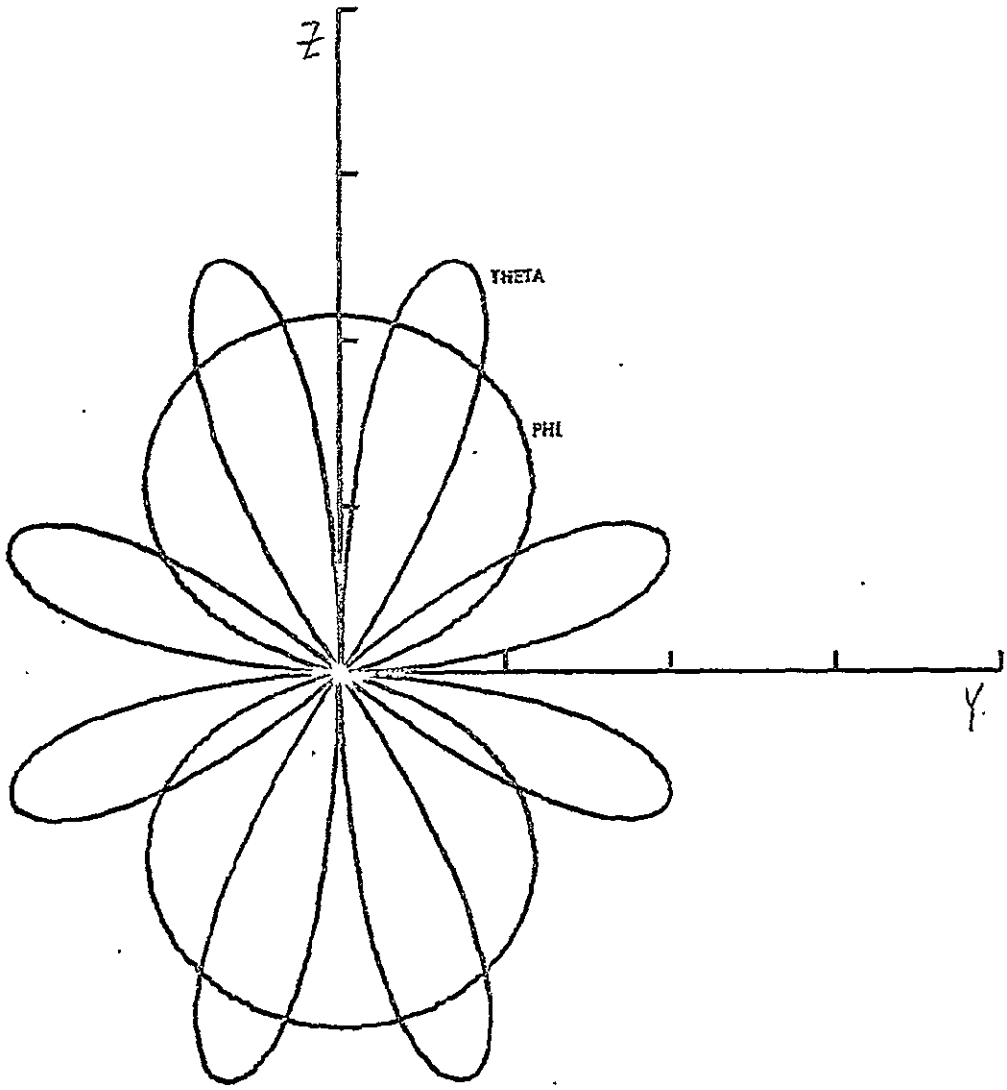

FIGURE B-63

FREQUENCY (MHZ) 1.65
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX +1.3
DB MIN -18.7

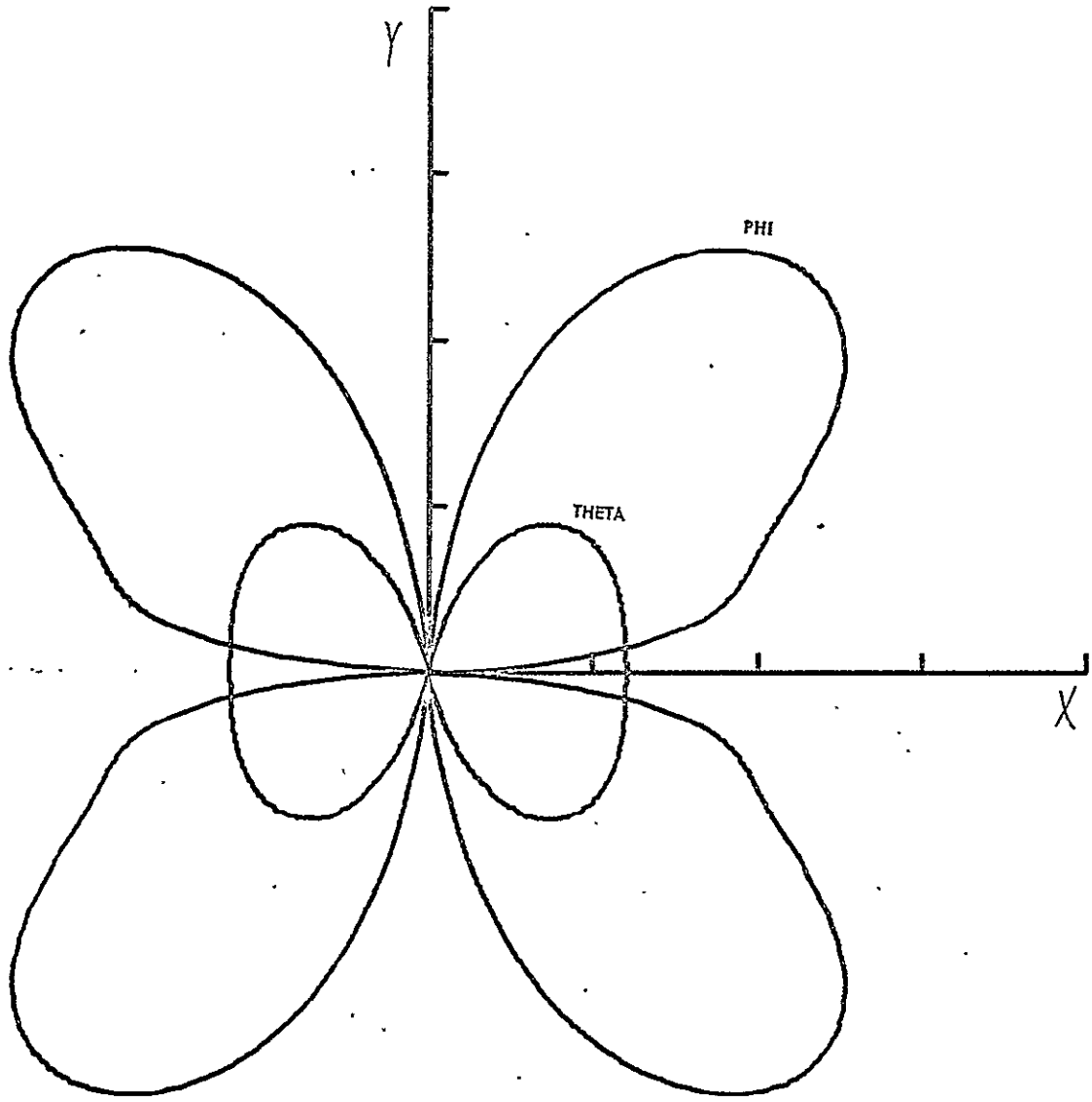

FIGURE B-64

FREQUENCY (MHZ) 1.65
Y-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX +1.3
DB MIN -18.7

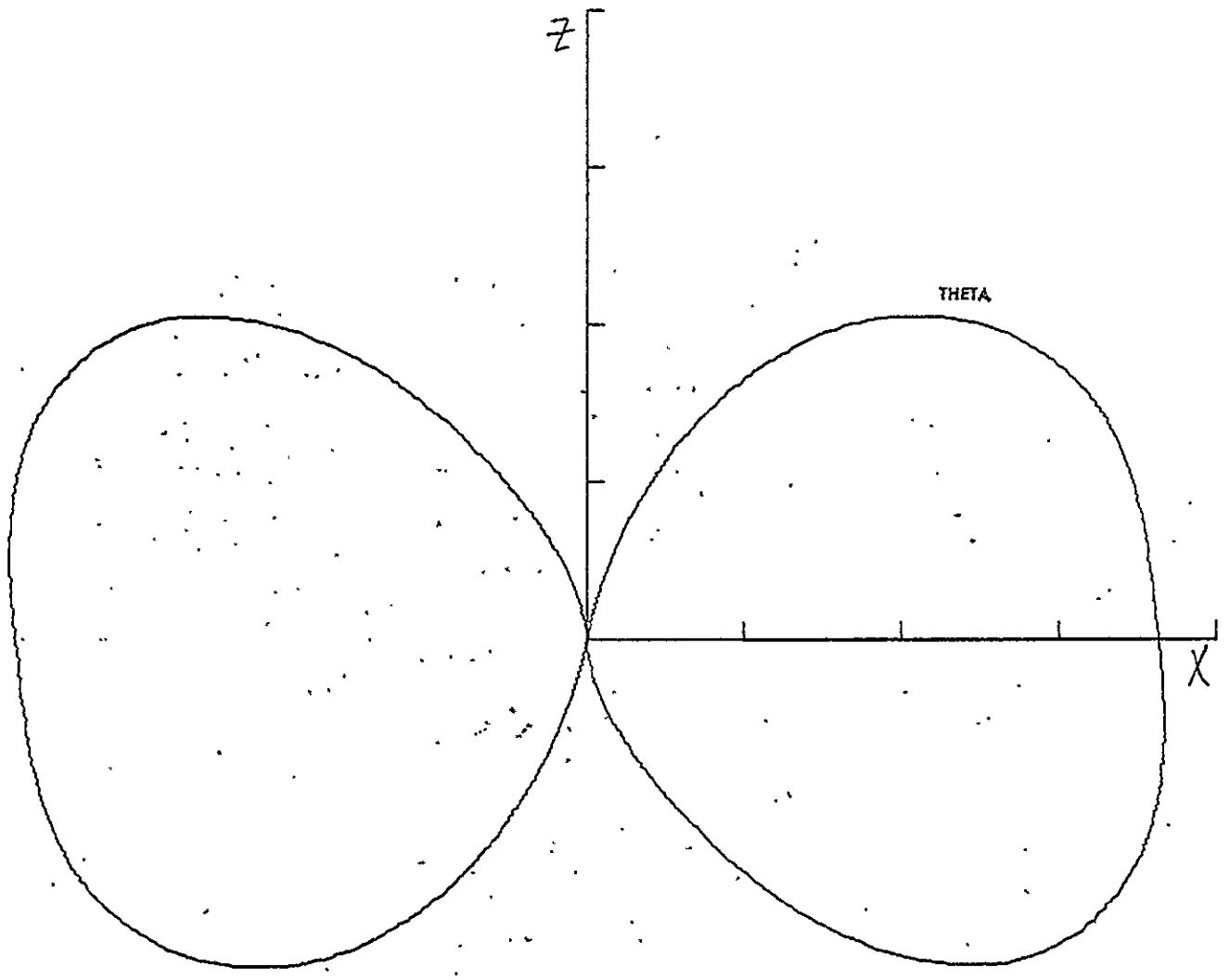

FIGURE B-65

FREQUENCY (MHZ) 2.20
V-ANT. LENGTH (FT) 250
MODE BALANCED
DB MAX +3.3
DB MIN -16.7

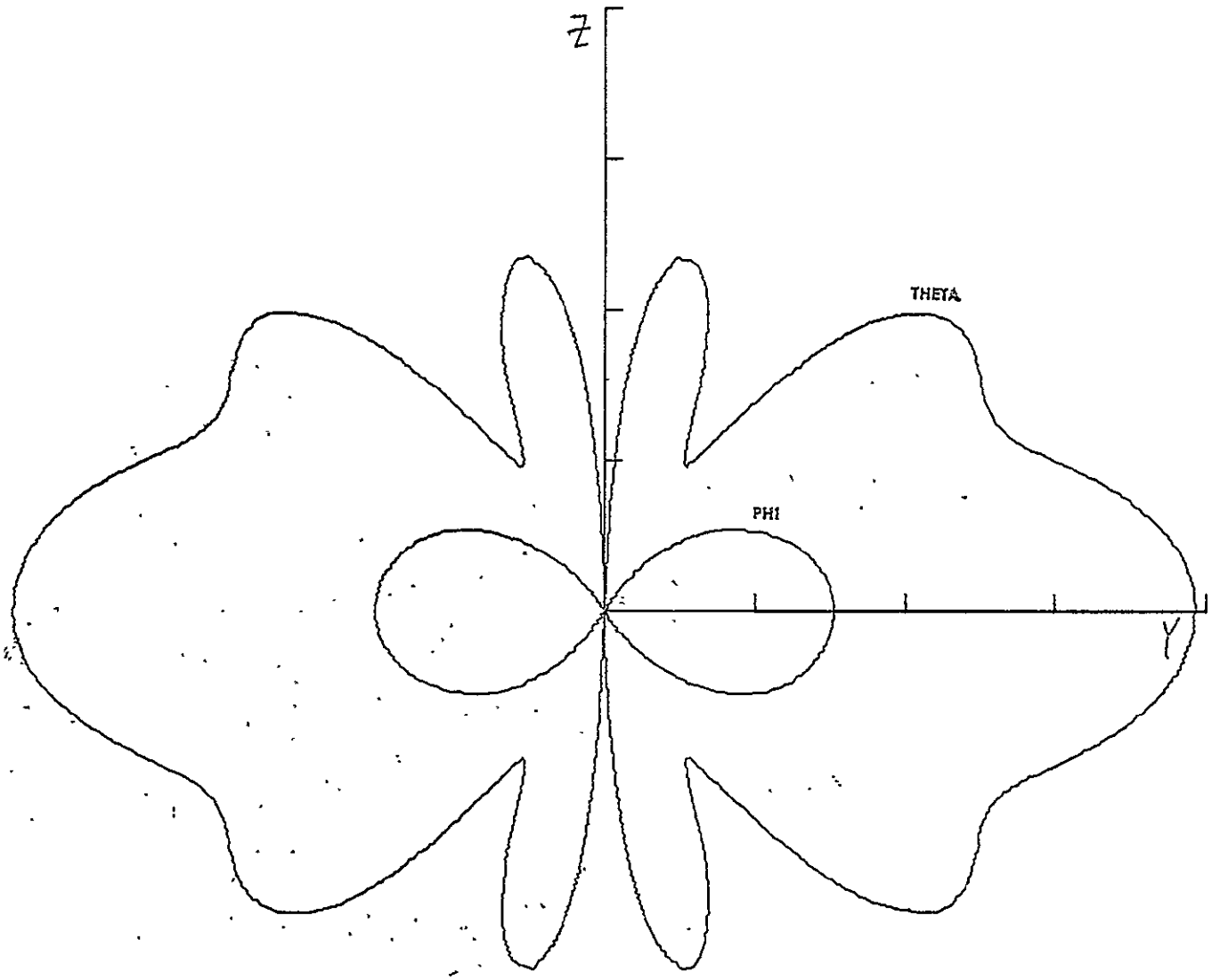

FIGURE B-66

FREQUENCY (MHZ) 2.20
ANT. LENGTH (FT) y50
MODE BALANCED
DB MAX +3.3
DB MIN −16.7

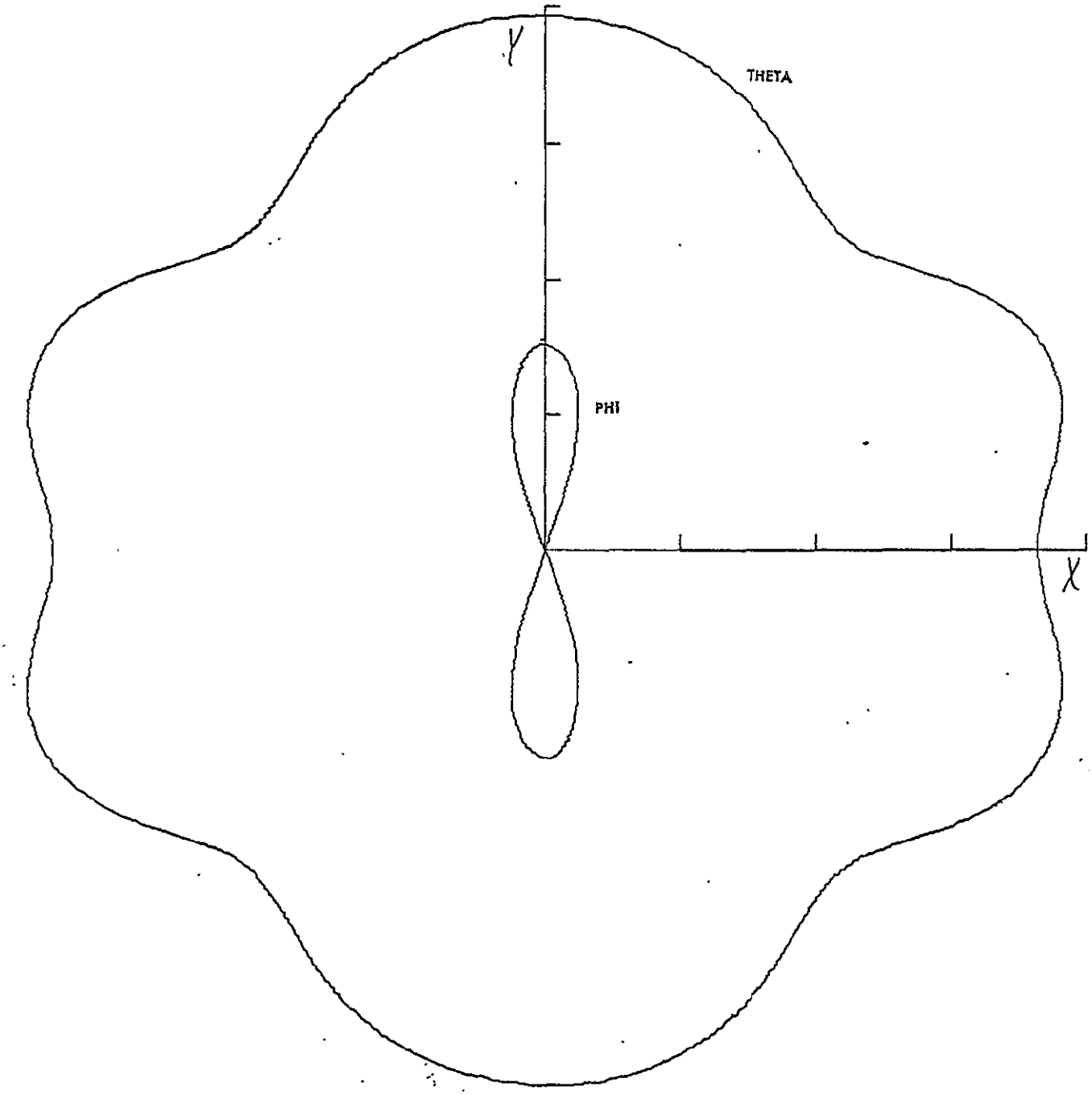

FIGURE B-67

FREQUENCY (MHZ) 2.20
V-ANT. LENGTH (FT) 150
MODE BALANCED
DB MAX +3.3
DB MIN -16.7

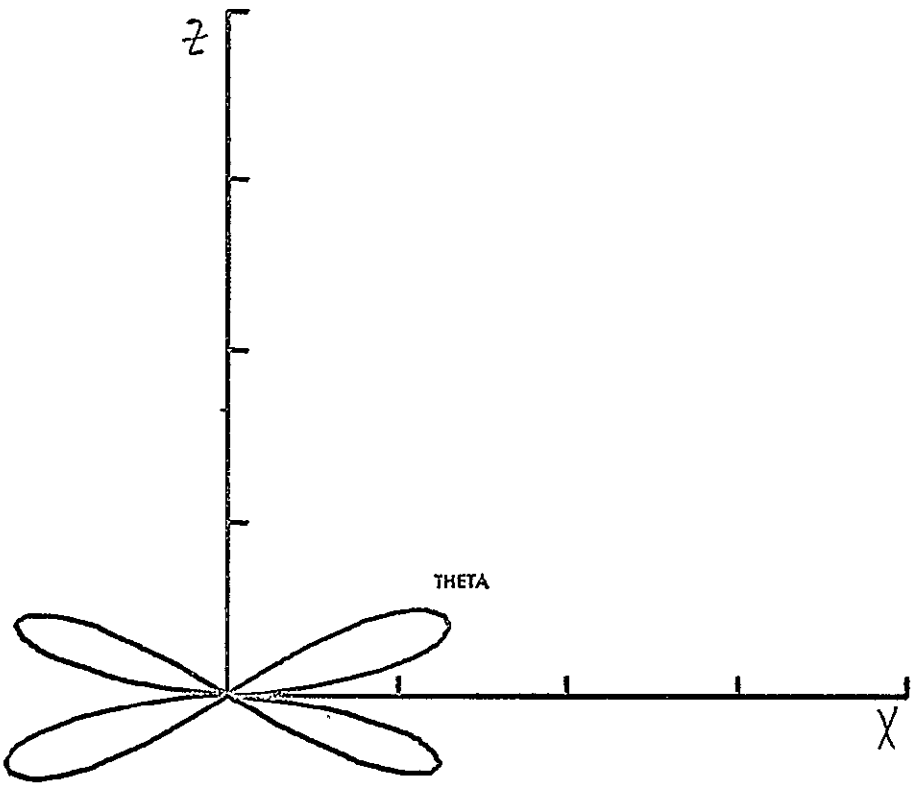

FIGURE B-68

FREQUENCY (MHZ) 2.20
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX +3.3
DB MIN -16.7

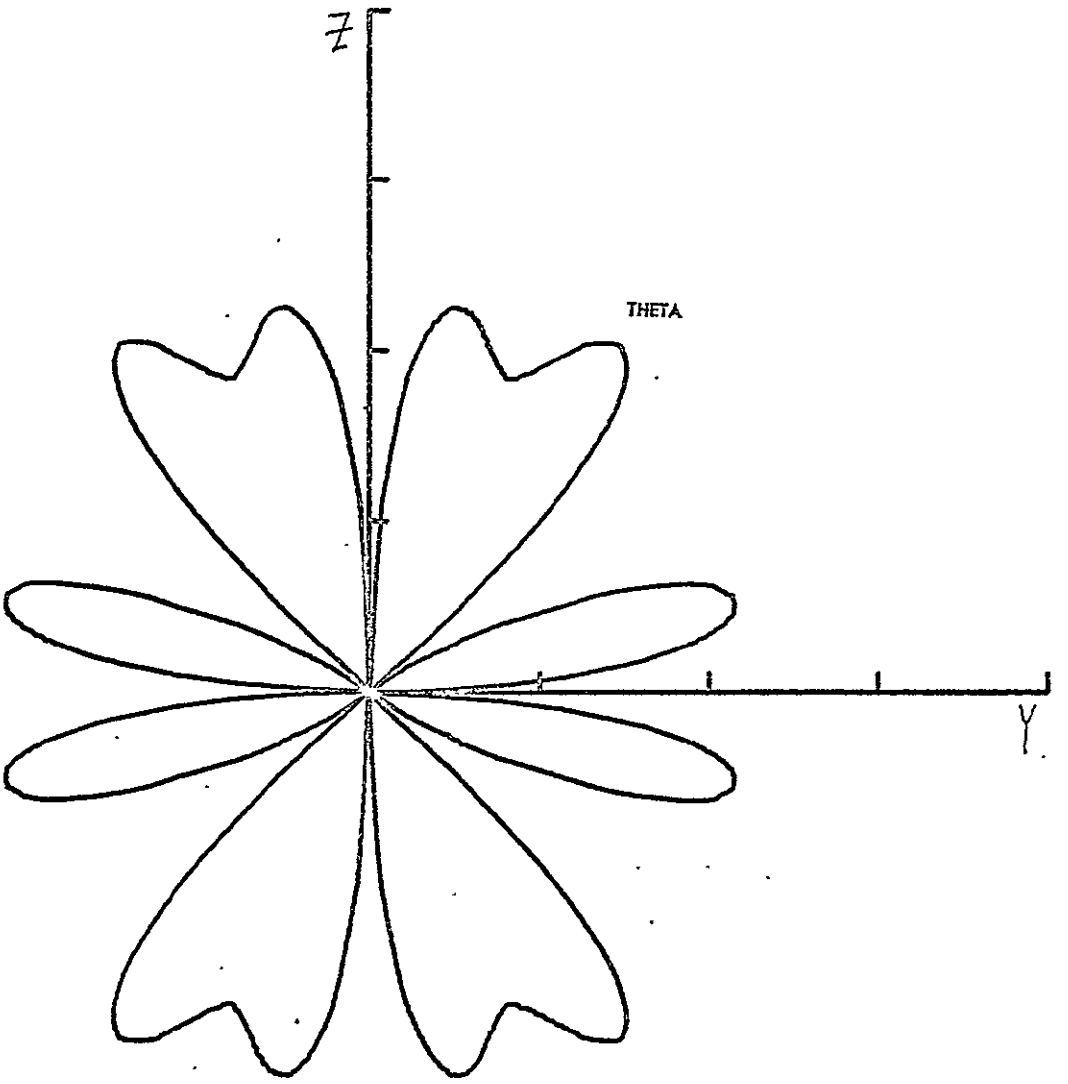

FIGURE B-69.

FREQUENCY (MHZ) 2.20
Y-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX +3.3
DB MIN −16.7

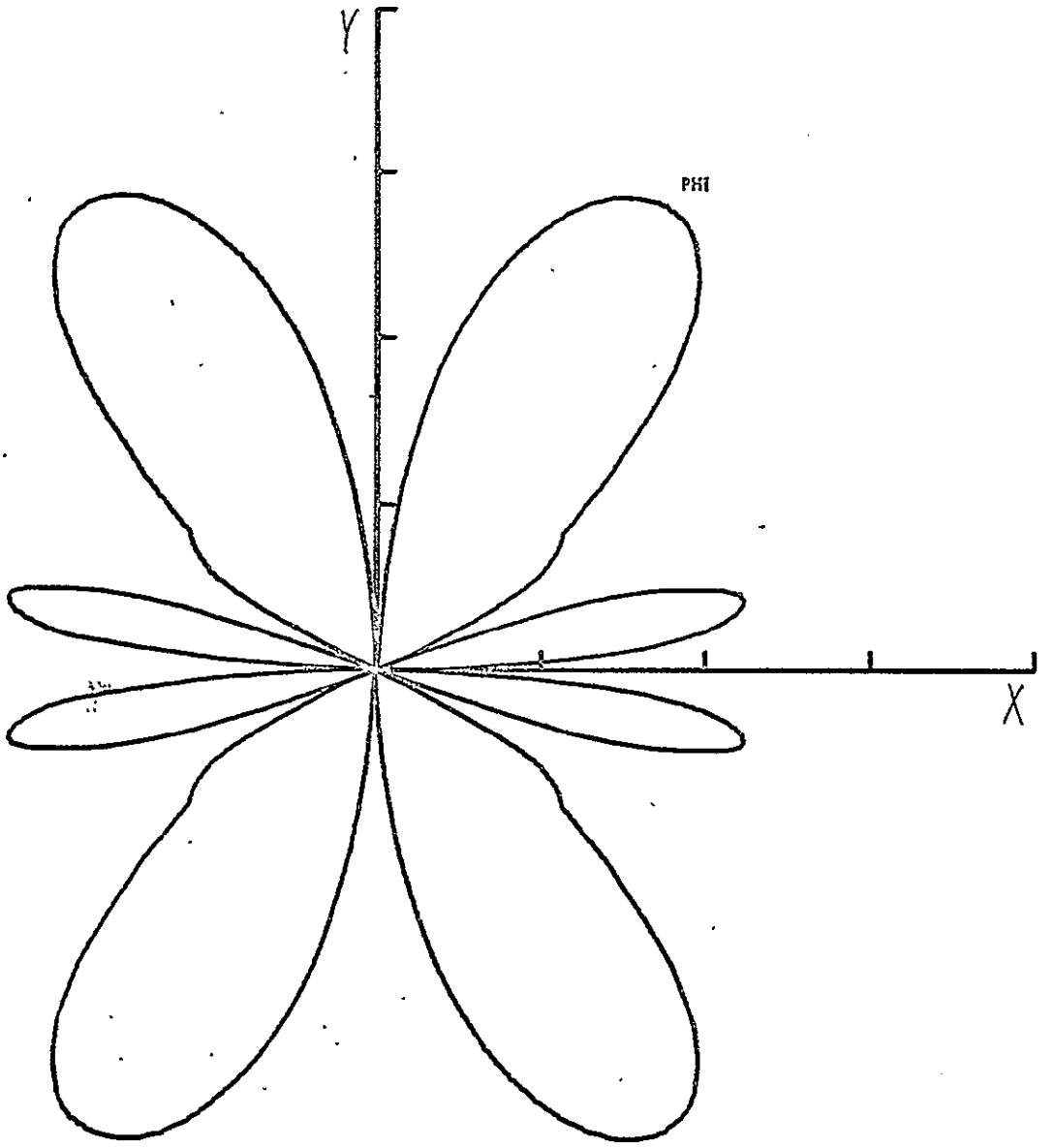

FIGURE B-70

FREQUENCY (MHZ) 2.20
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX +3.3
DB MIN -16.7

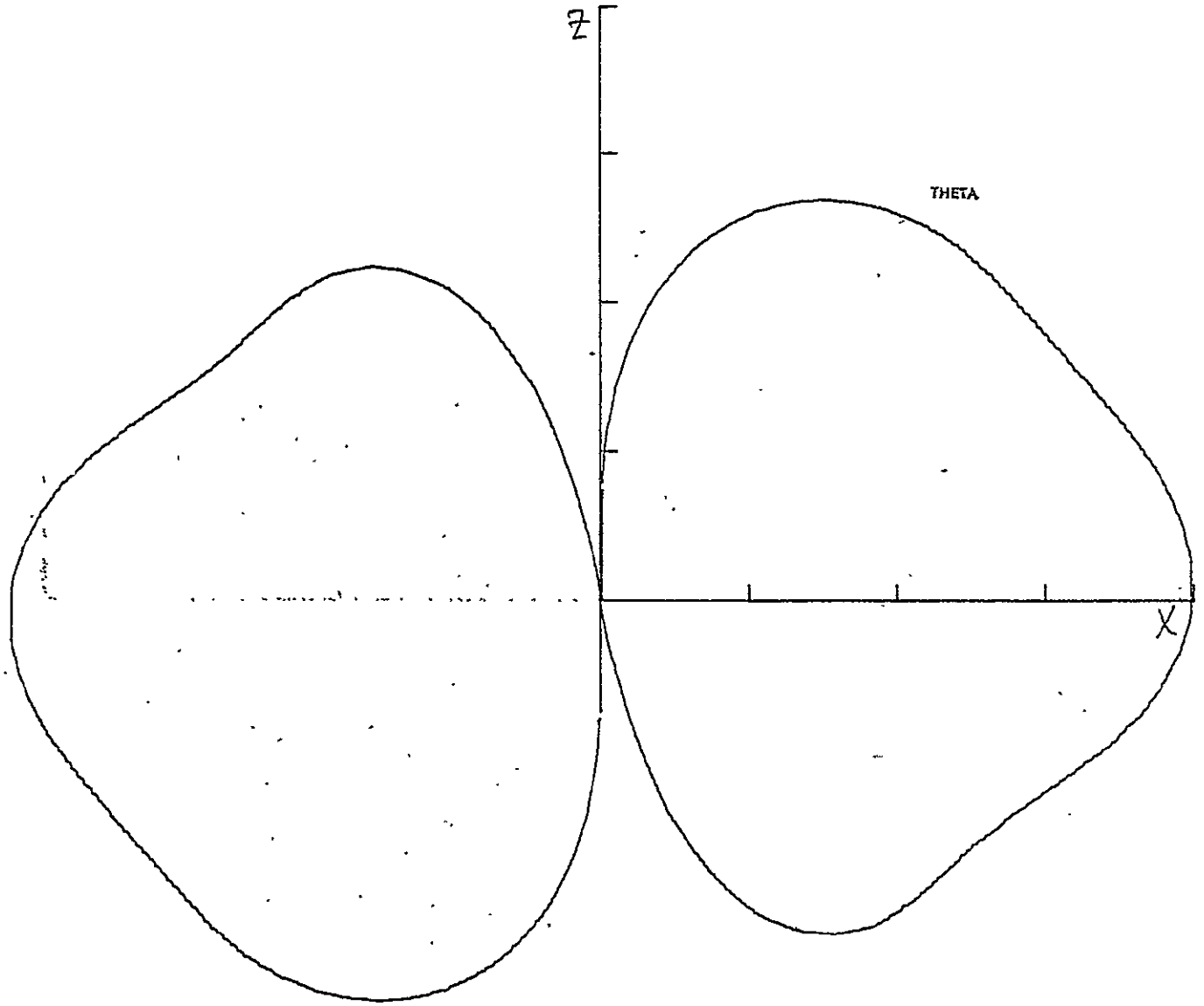

FIGURE B-71

FREQUENCY (MHZ) 2.80
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX +2.8
DB MIN -17.2

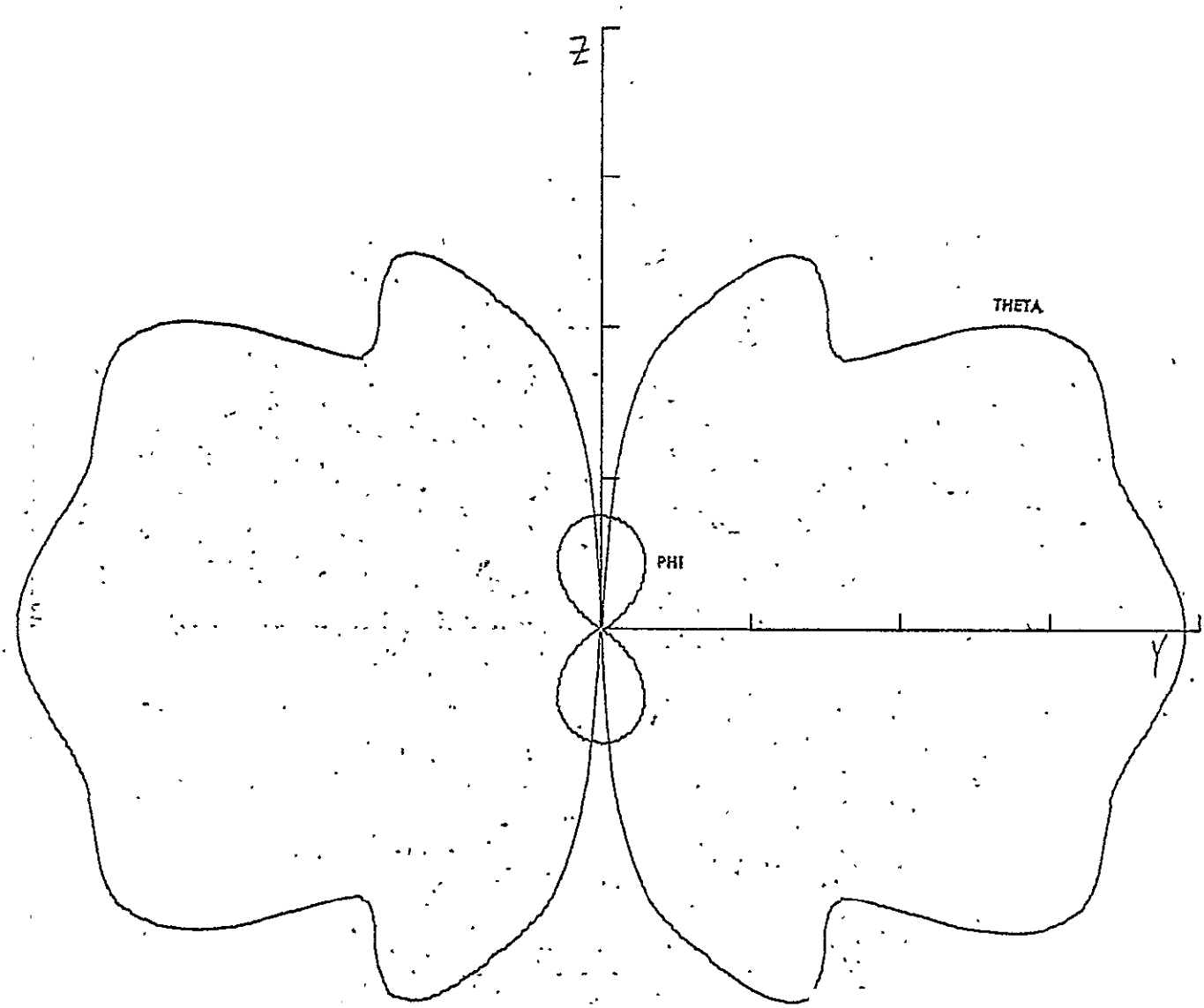

FIGURE B-72

FREQUENCY (MHZ) 2.80
V-ANT. LENGTH (FT) 950
MODE BALANCED
DB MAX + 2.8
DB MIN. − 17.2

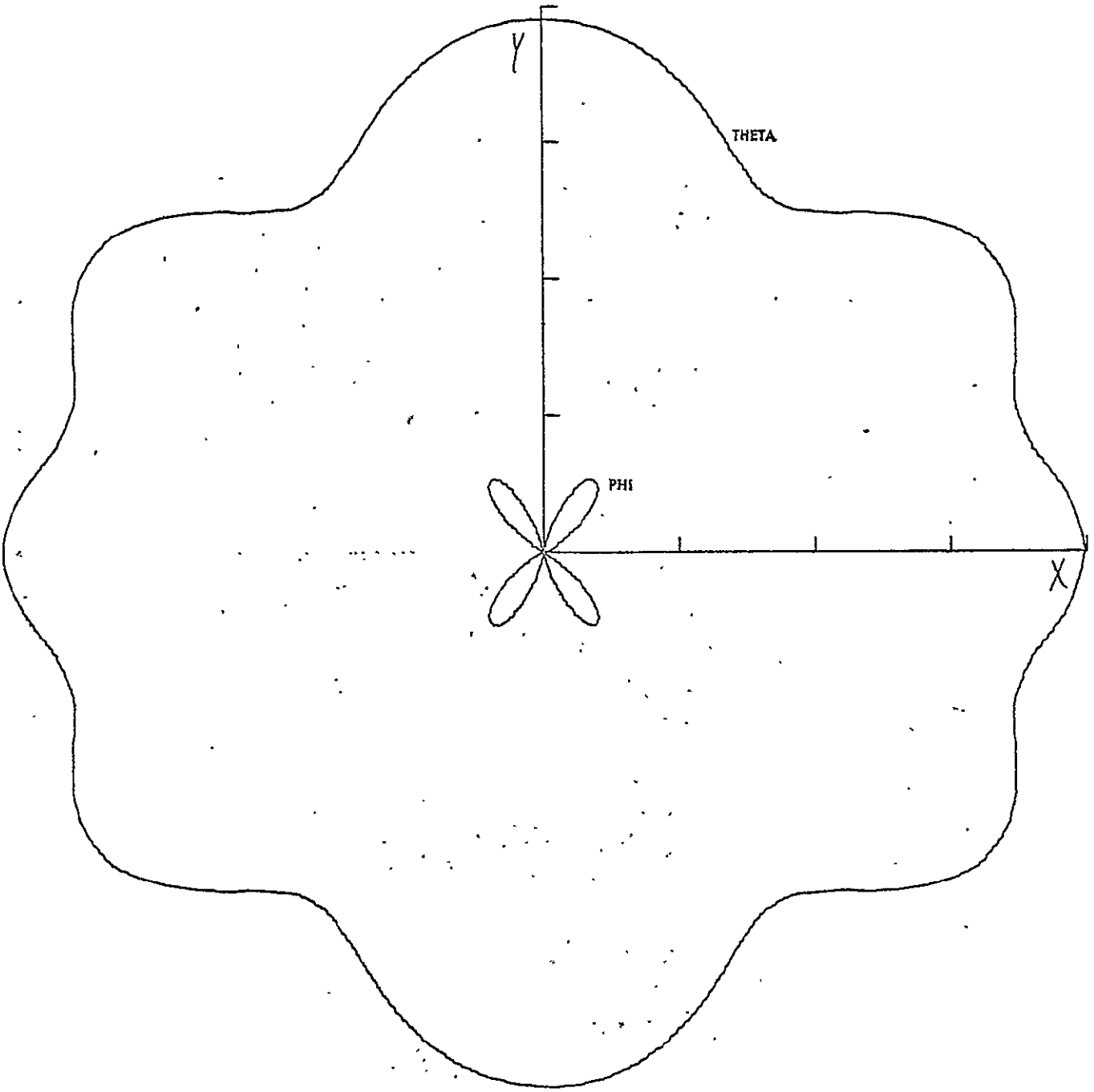

FIGURE B-73

FREQUENCY (MHZ) 2.80
V-ANT. LENGTH (FT) 250
MODE BALANCED
DB MAX +2.8
DB MIN -17.2

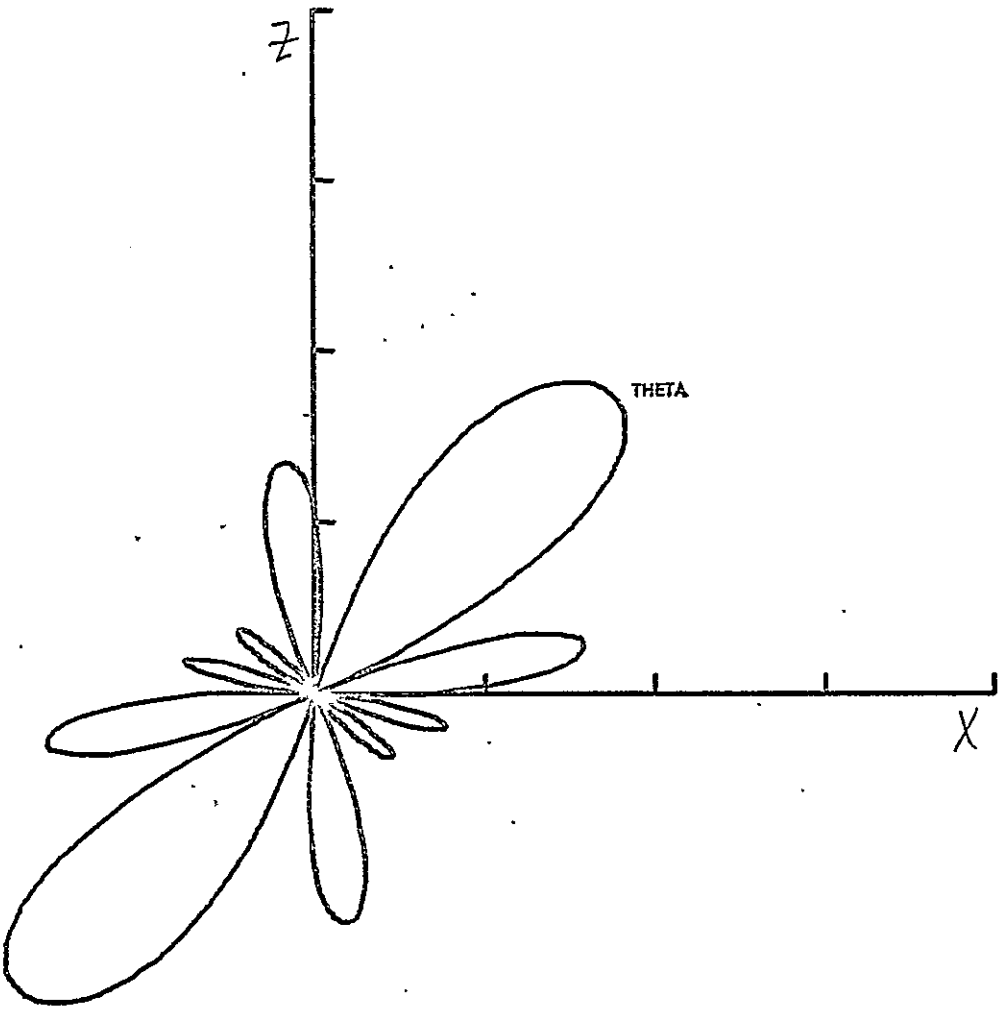

FIGURE B-74

FREQUENCY (MHZ) 2.80
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX +2.8
DB MIN -17.2

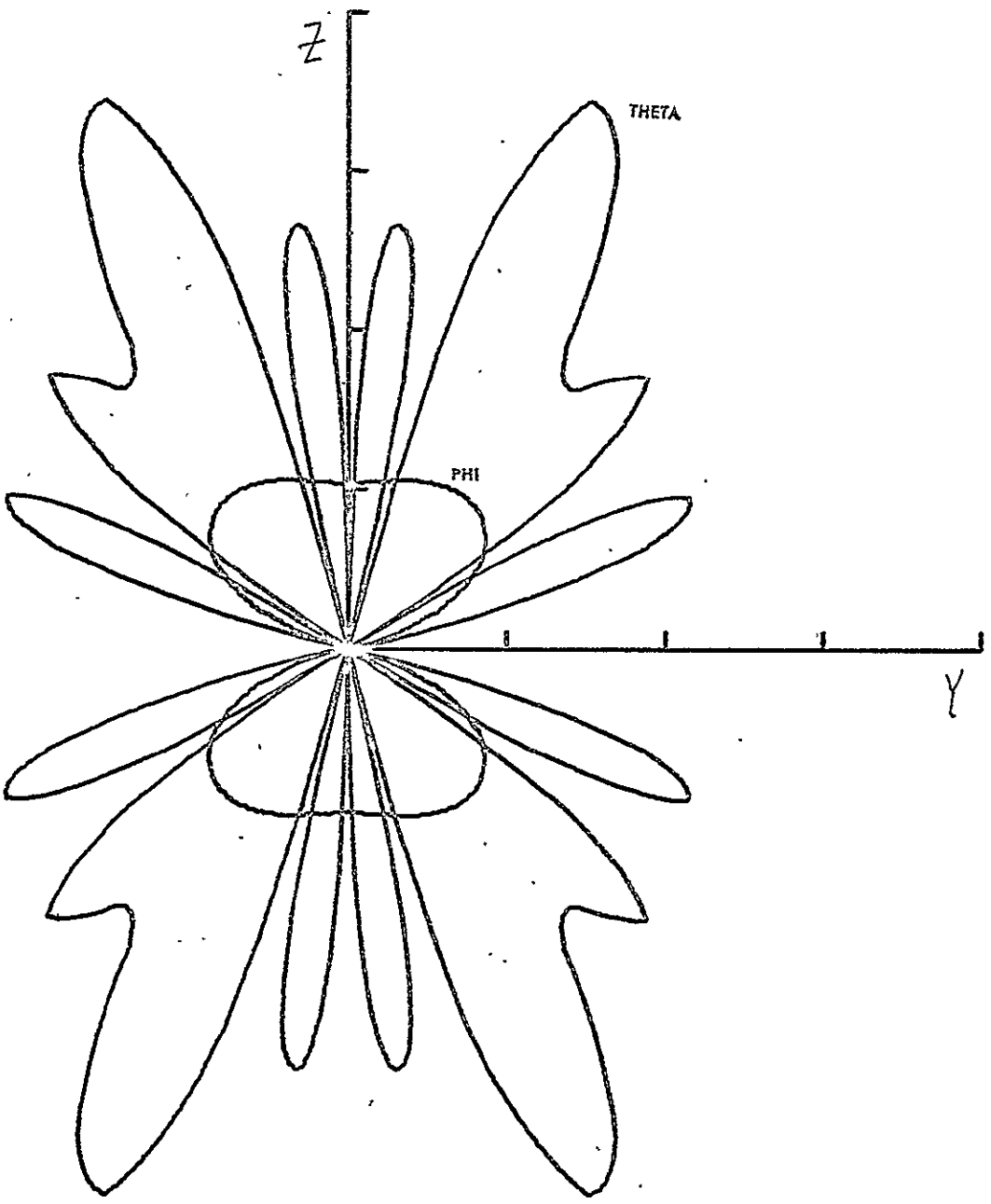

FIGURE B-75

FREQUENCY (MHZ) 2.80
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX +2.8
DB MIN -17.2

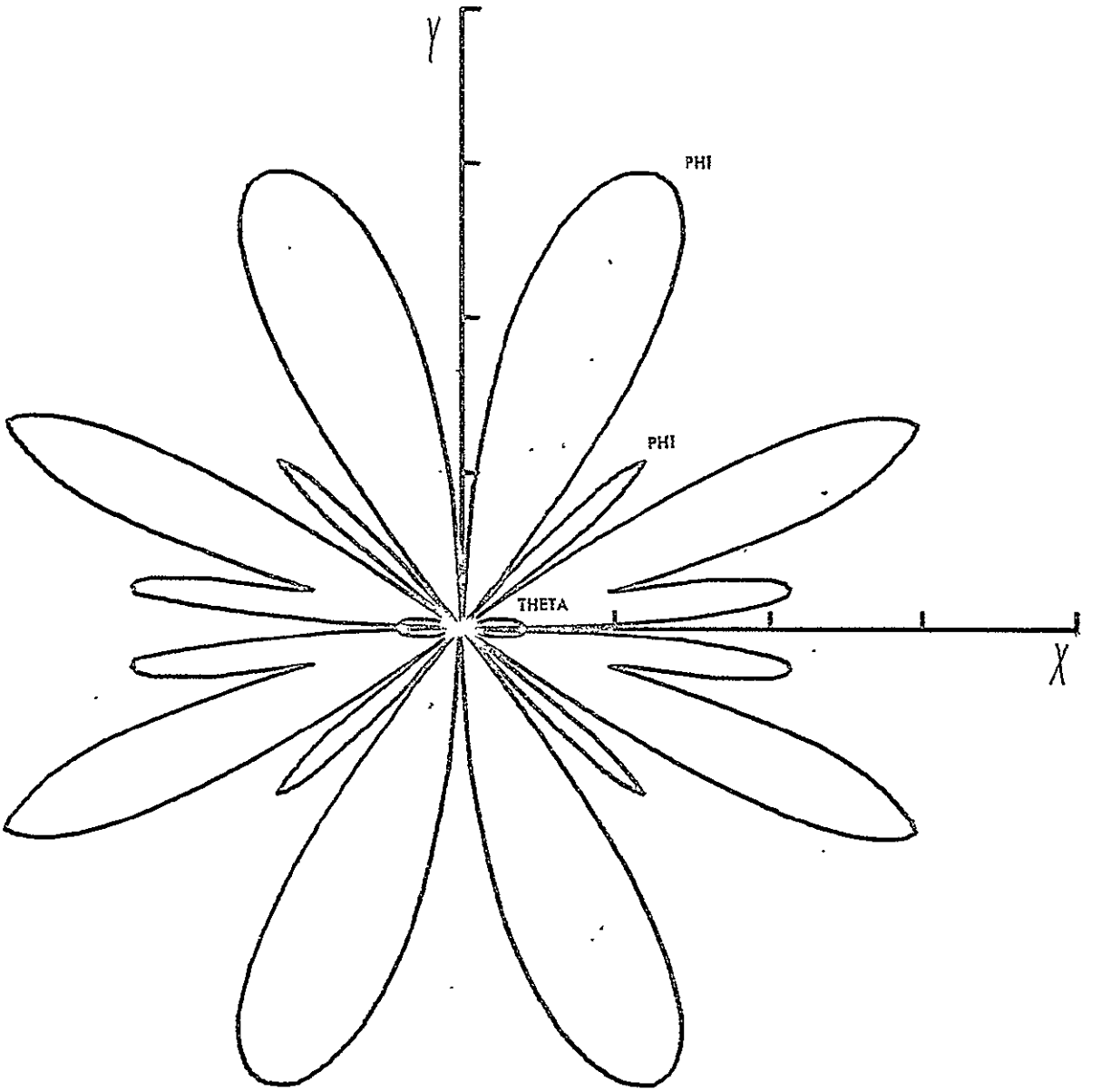

FIGURE B-76

FREQUENCY (MHZ) 2.80
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX +2.8
DB MIN -17.2

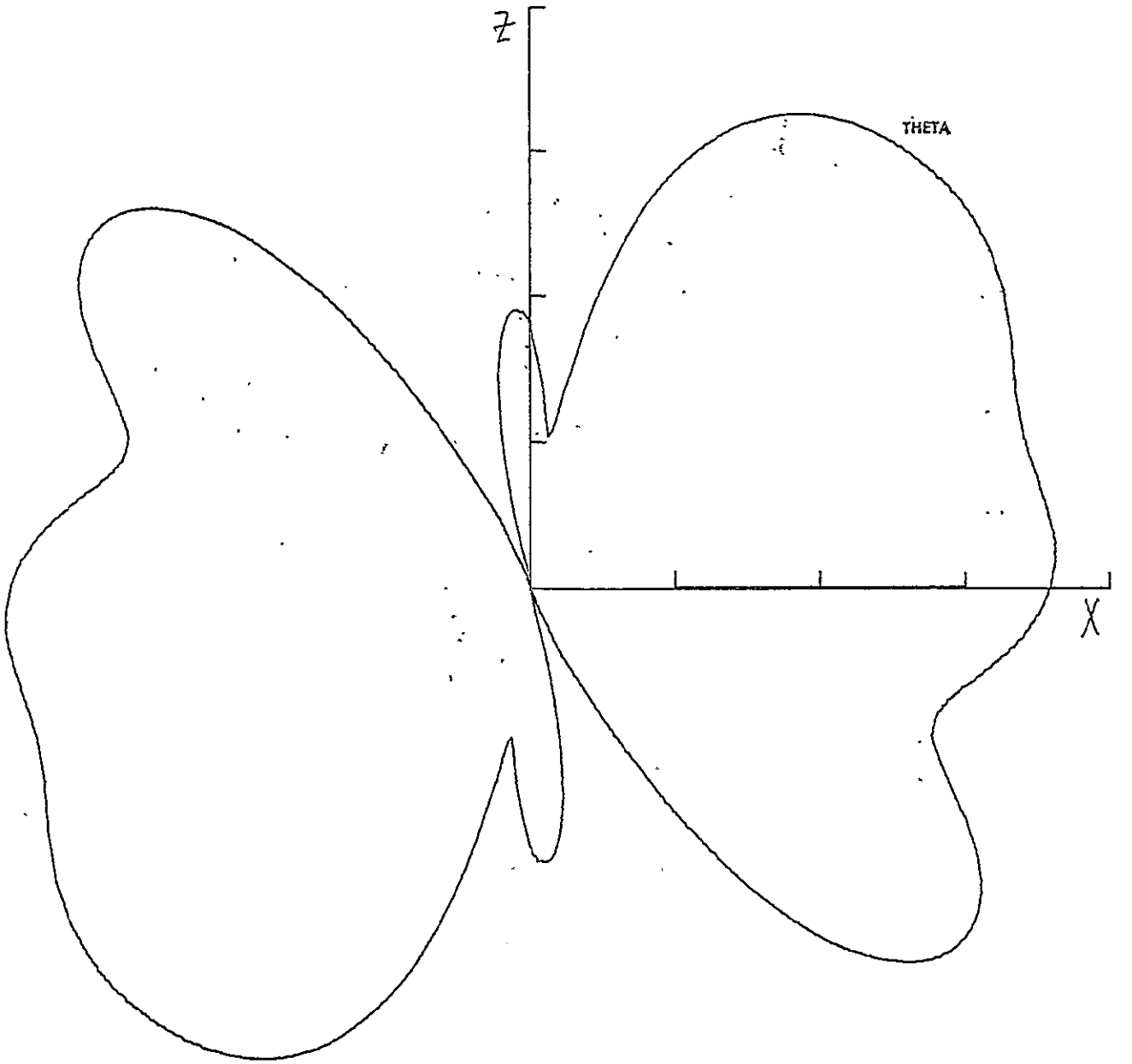

FIGURE B-77

FREQUENCY (MHZ) 3.93
Y-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX +1.7
DB MIN -18.3

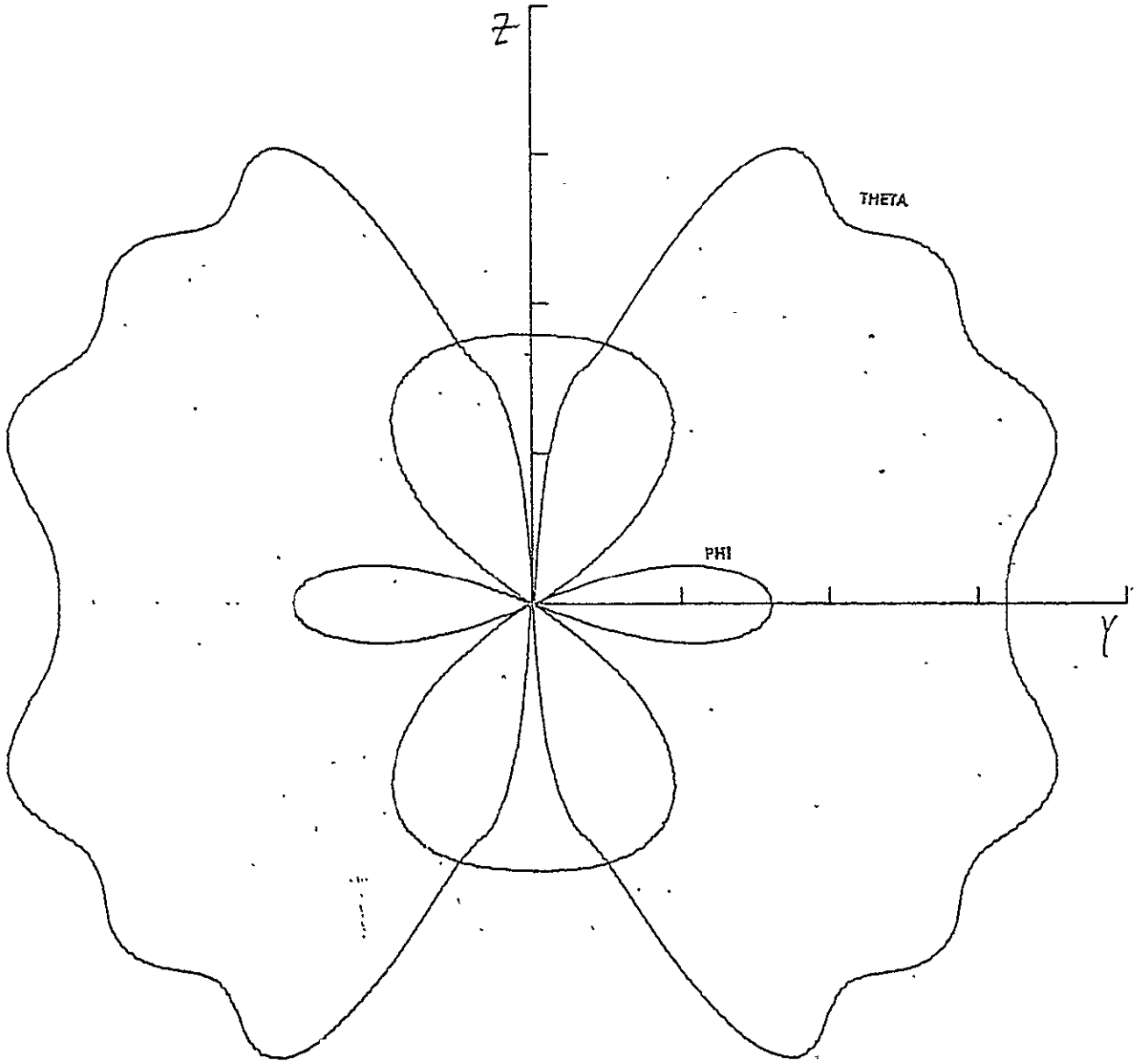

FIGURE B-78

FREQUENCY (MHZ) 3.93
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX +1.7
DB MIN -18.3

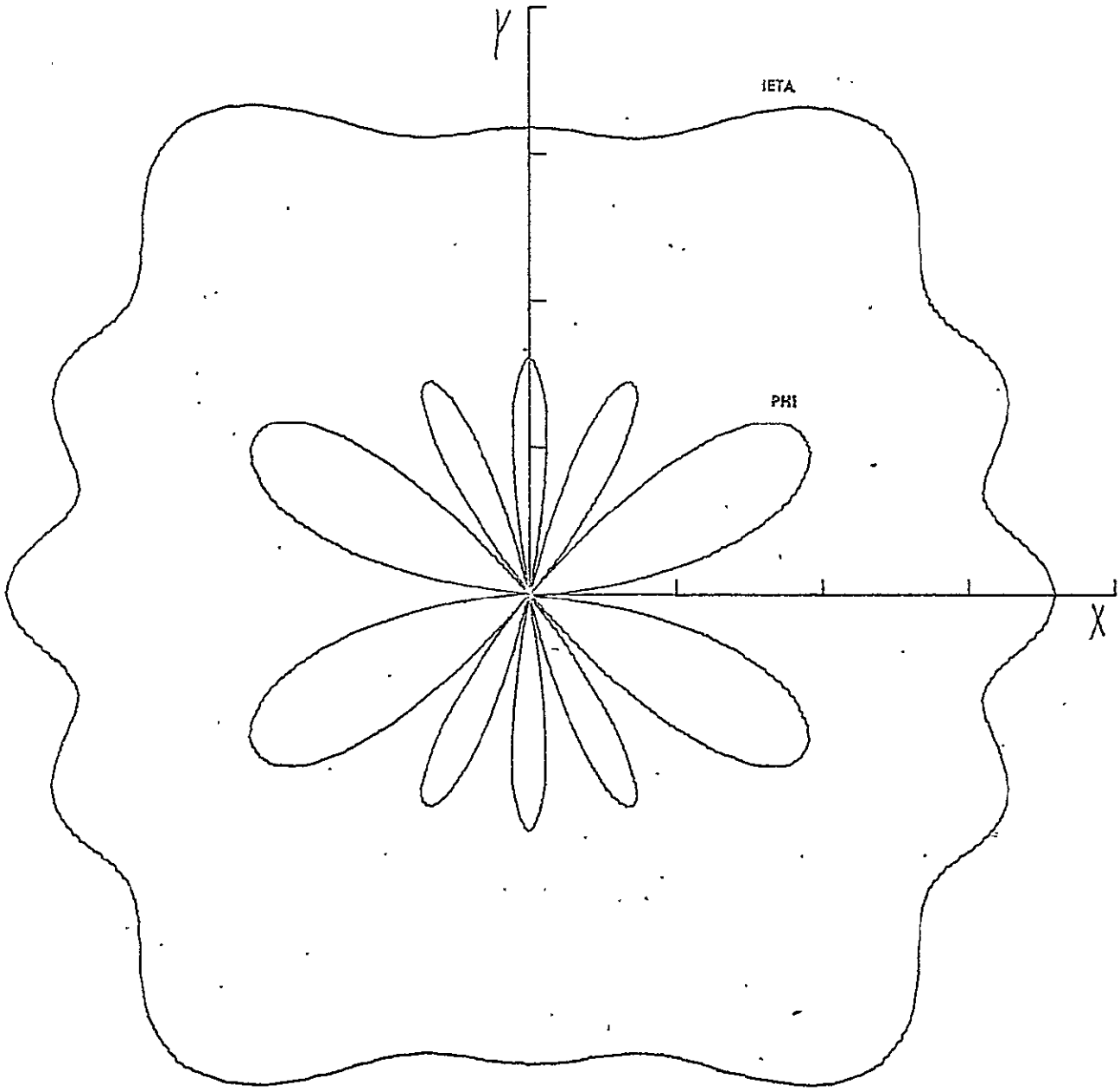

FIGURE B-79

FREQUENCY (MHZ) 3.93
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX +1.7
DB MIN -18.3

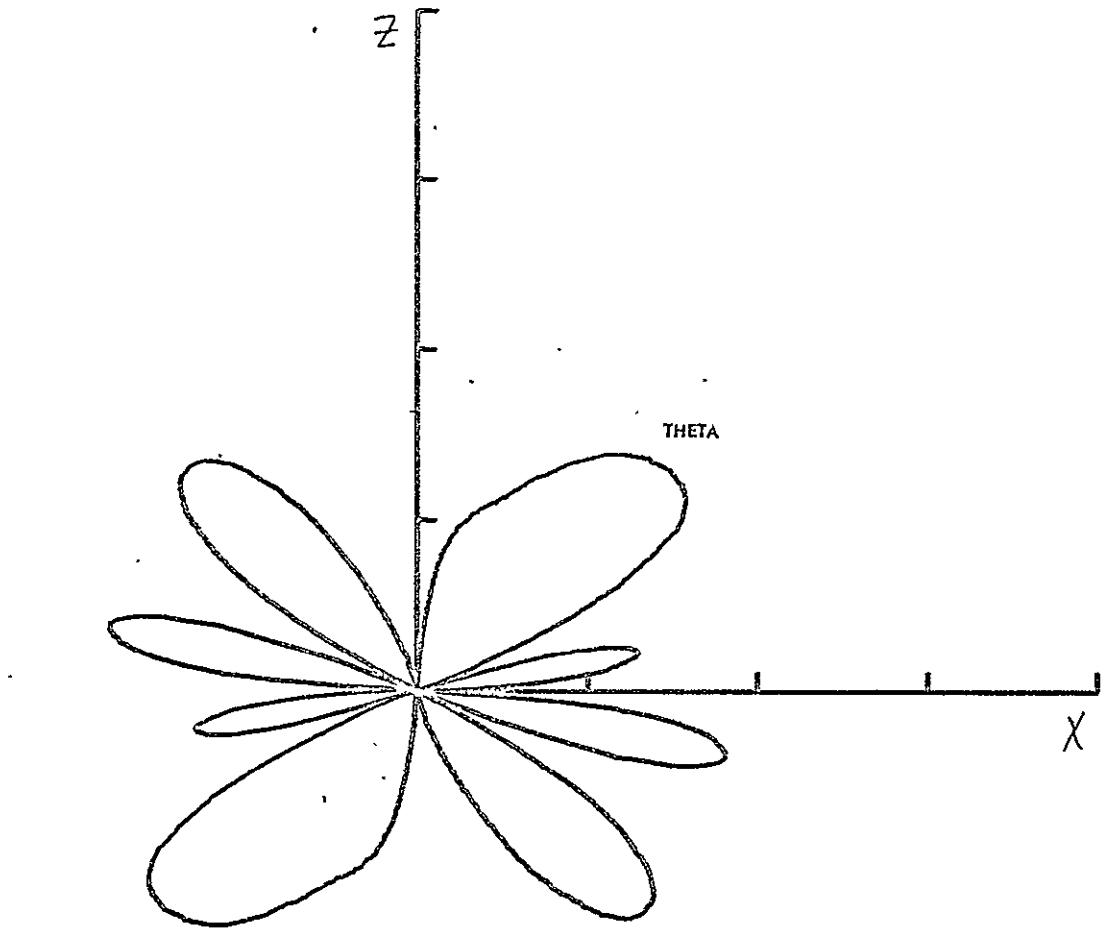

FIGURE B - 80

FREQUENCY (MHZ) 3.93
V-ANT. LENGTH (FT) y50
MODE UNBALANCED
DB MAX +1.7
DB MIN −18.3

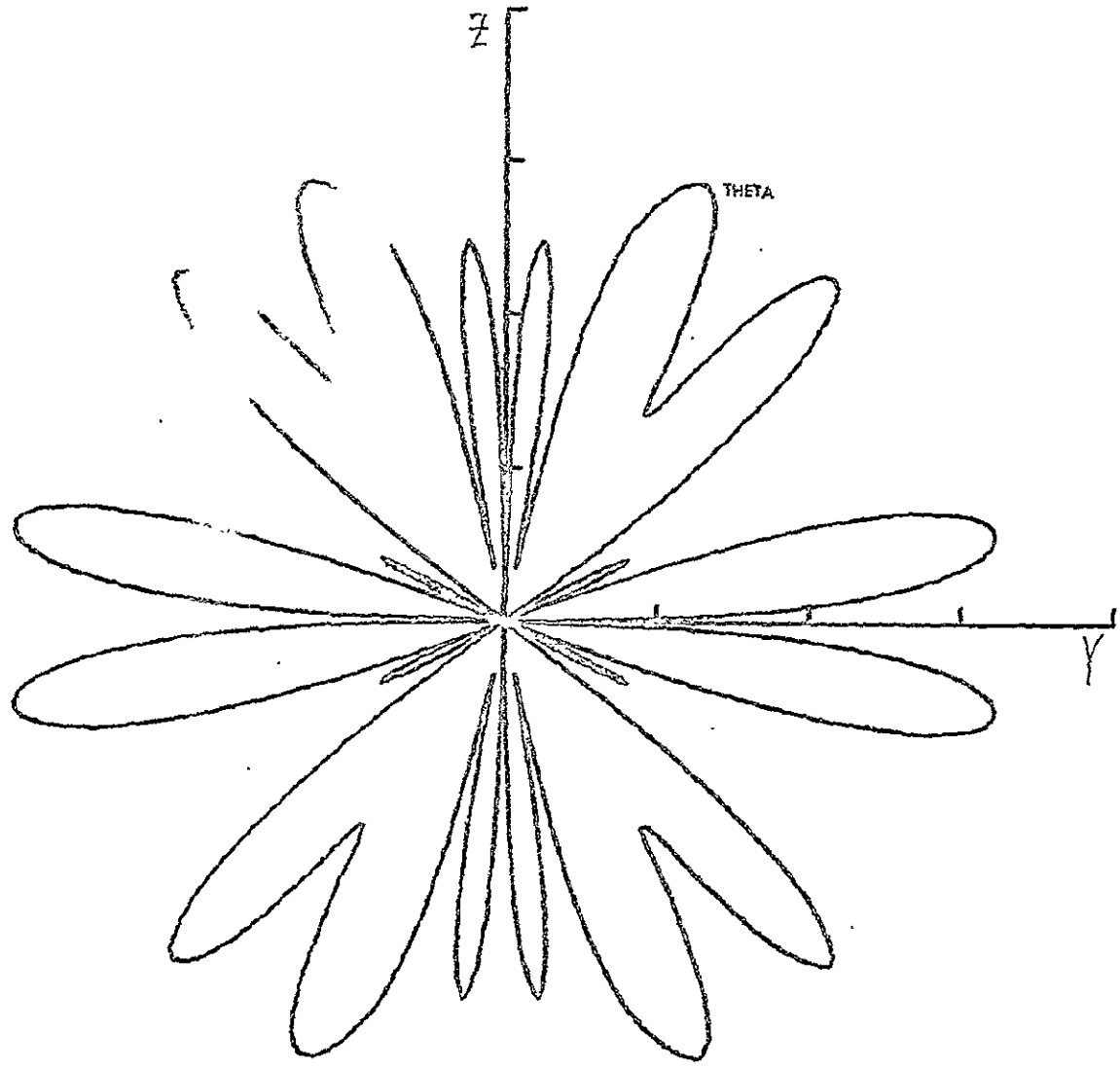

FIGURE B-81

FREQUENCY (MHZ) 3.93
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX +1.7
DB MIN -18.3

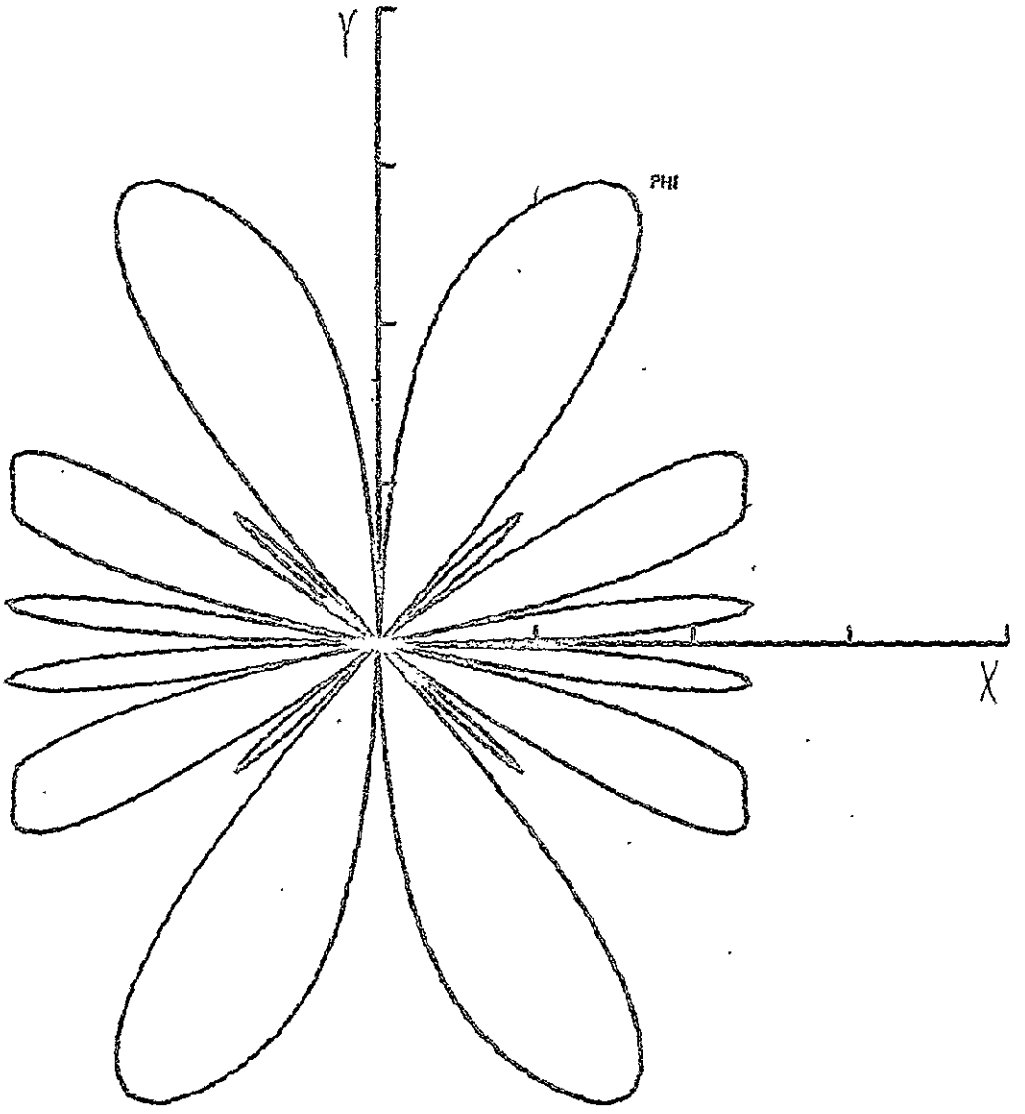

FIGURE B-82

FREQUENCY (MHZ) 3.93
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX +1.7
DB MIN -18.3

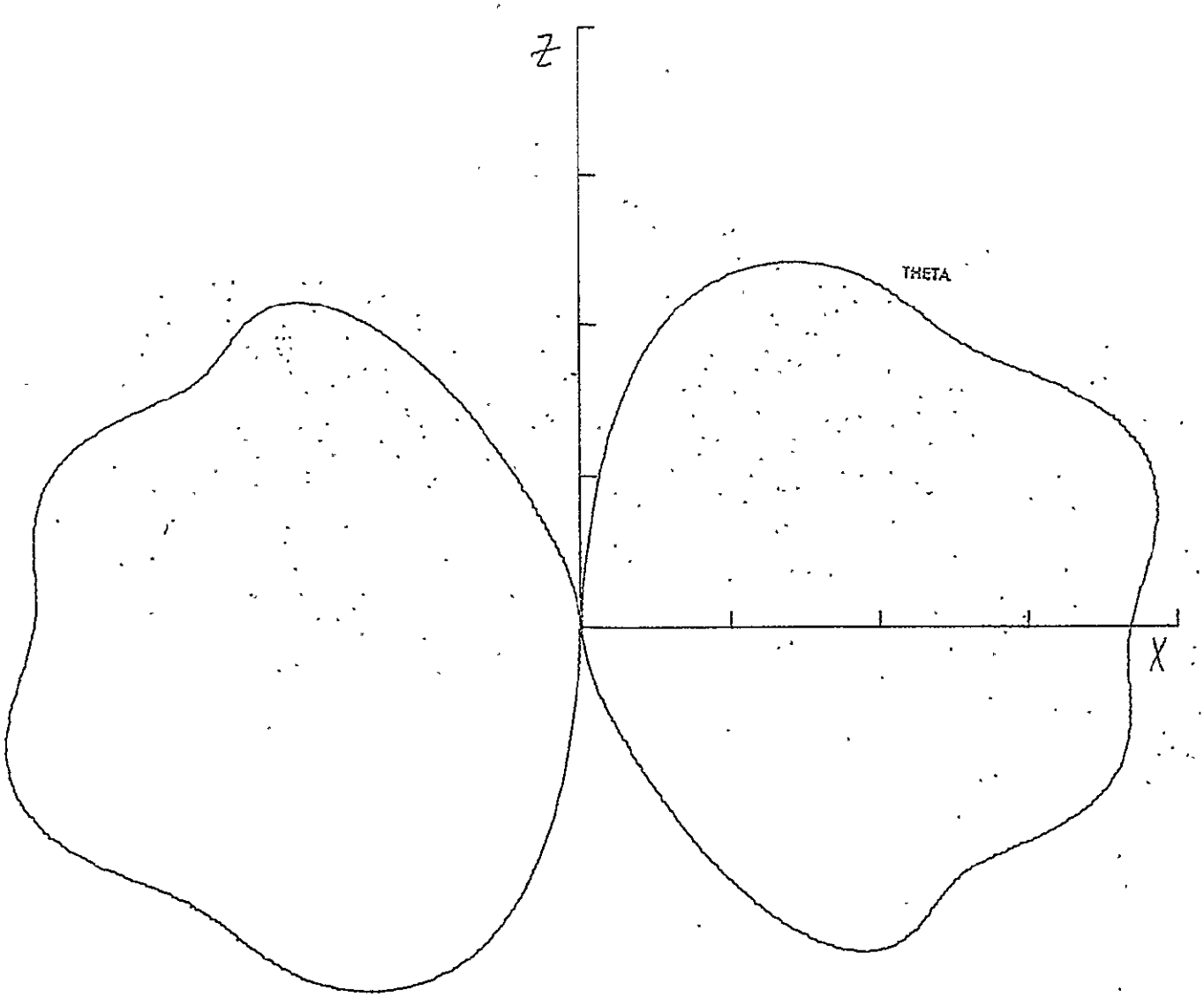

FIGURE B-83

FREQUENCY (MHZ) 4.70
V-ANT. LENGTH (FT) 950
MODE BALANCED
DB MAX +2.9
DB MIN -17.1

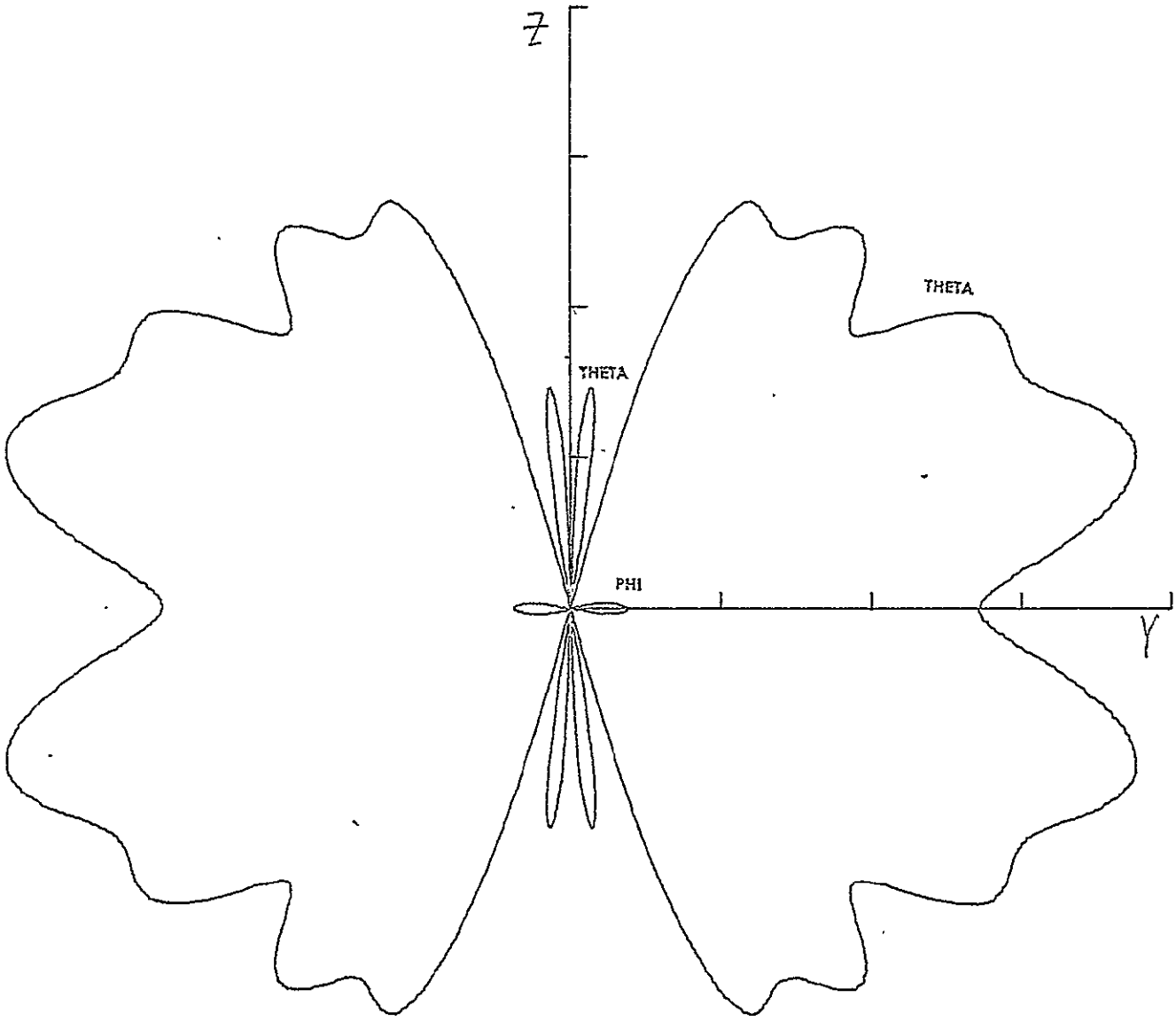

FIGURE B-84

FREQUENCY (MHZ) 4.70
V-ANT. LENGTH (FT) 759
MODE BALANCED
DB MAX +2.9
DB MIN -17.1

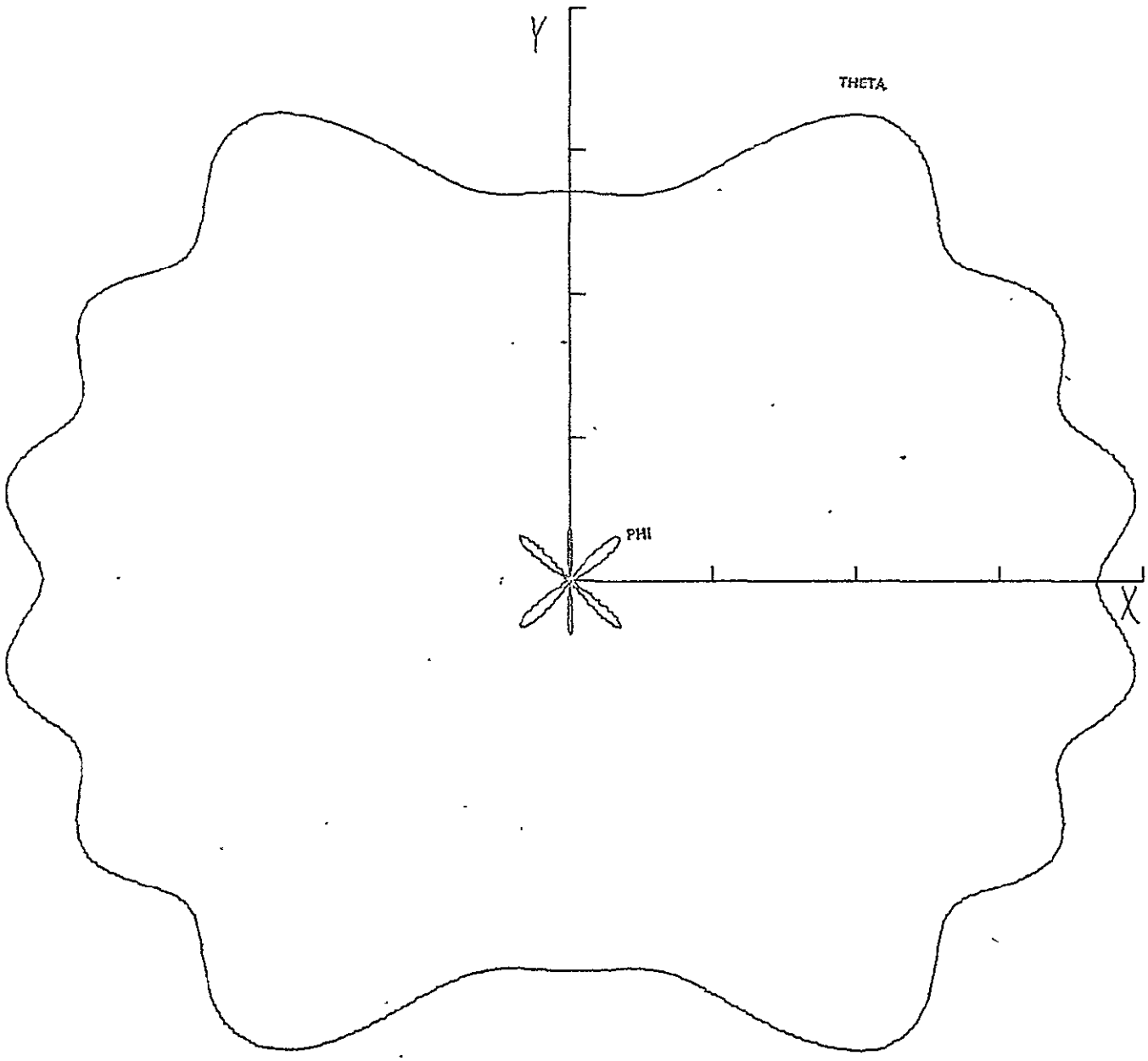

FIGURE B-85

FREQUENCY (MHZ) 4.70
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX + 2.9
DB MIN - 17.1

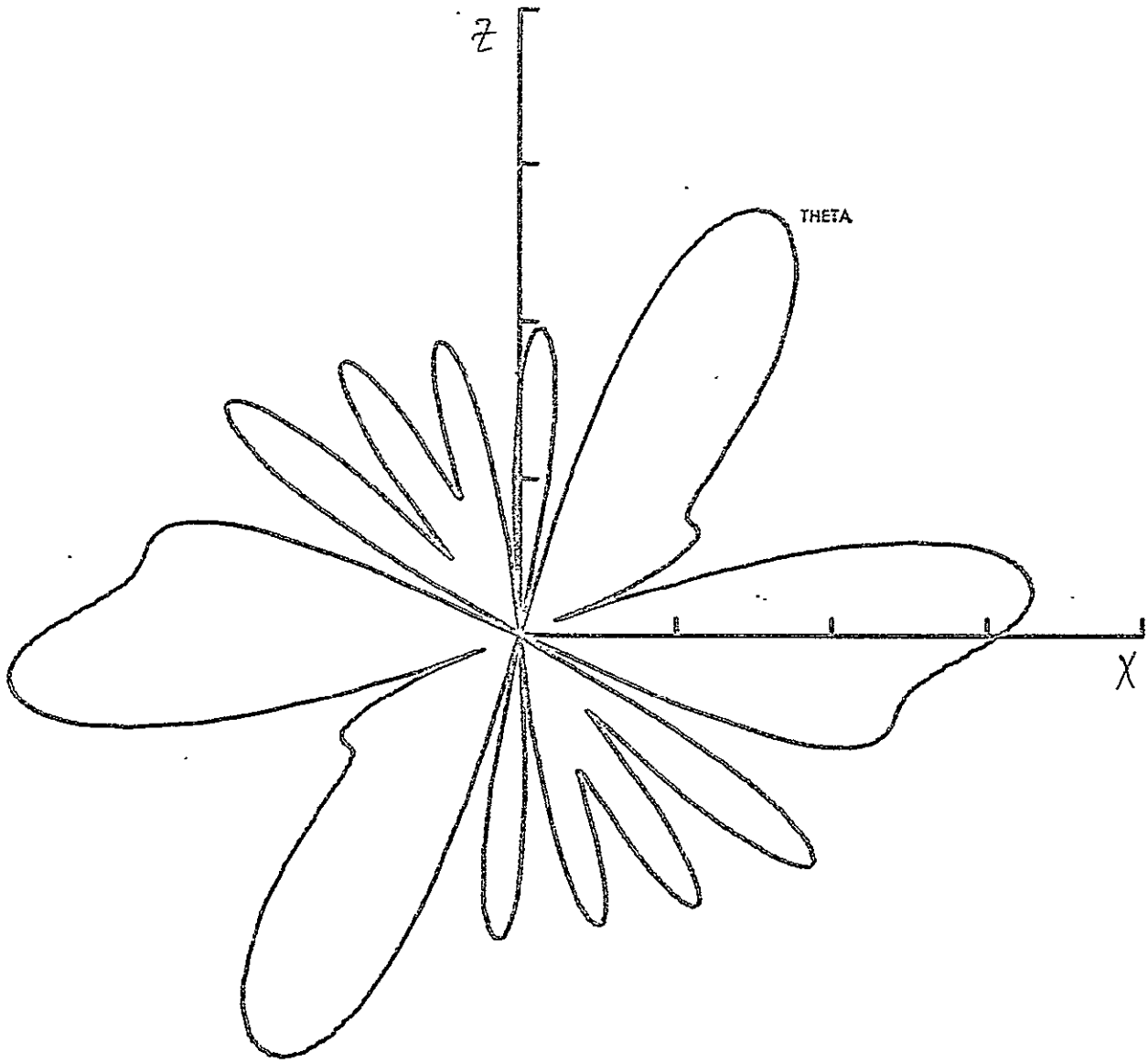

FIGURE B-86

FREQUENCY (MHZ) 4.70
V-ANT. LENGTH (FT) 750.
MODE UNBALANCED
DB MAX. +2.9
DB MIN -17.1

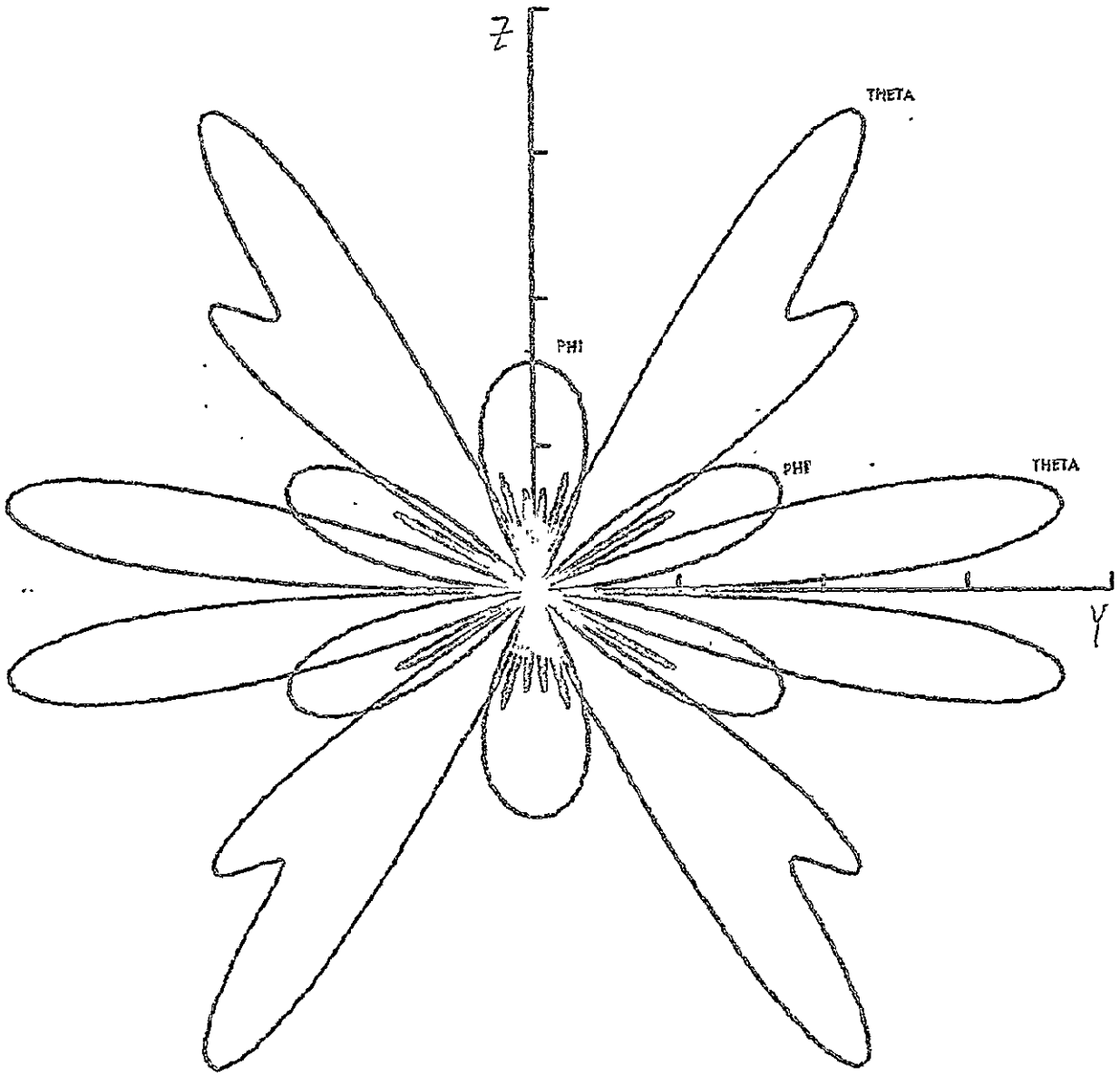

FIGURE B-87

FREQUENCY (MHZ) 4.70
V-ANT. LENGTH (FT) 9.50
MODE UNBALANCED
DB MAX +2.9
DB MIN -17.1

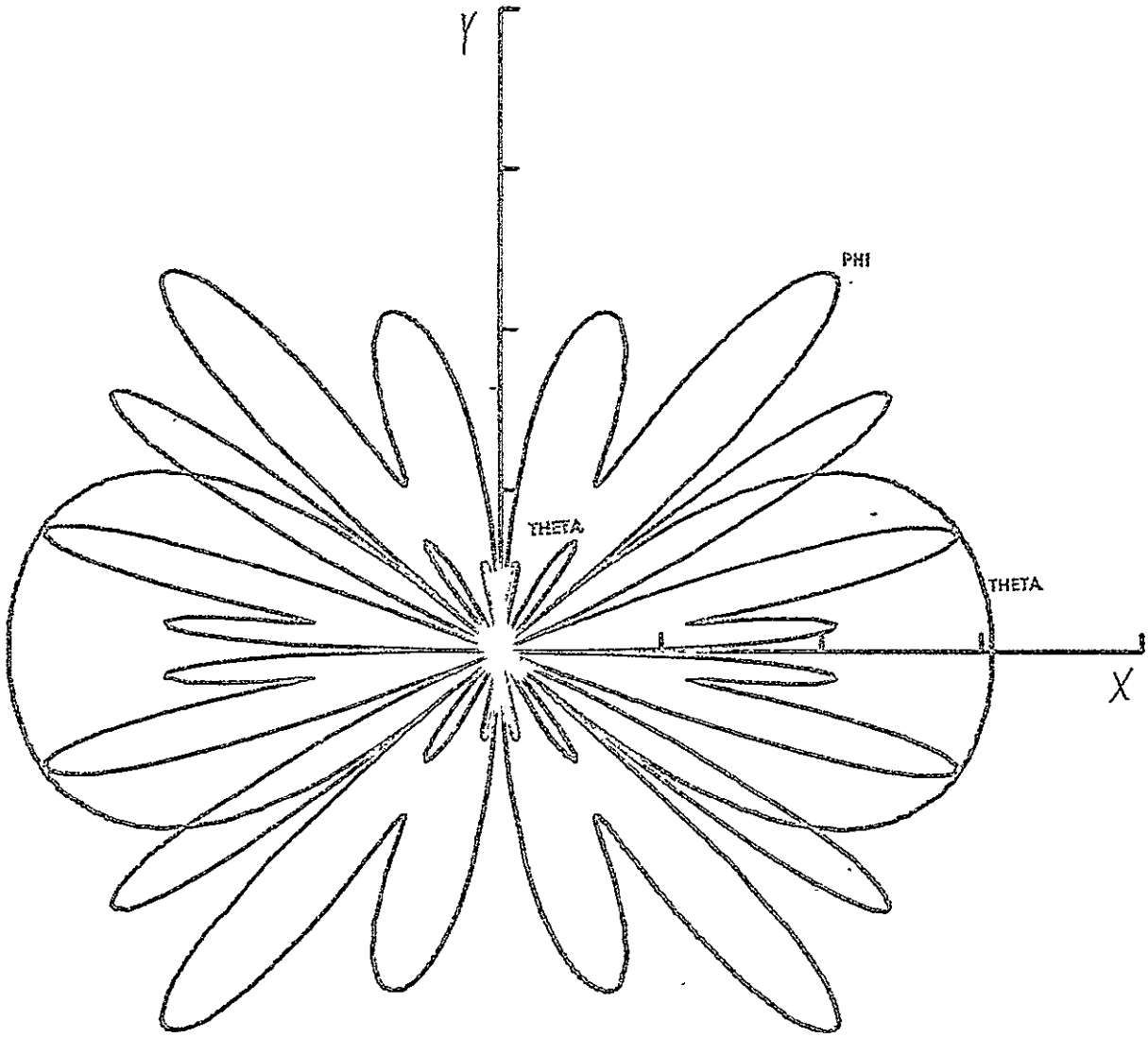

FIGURE B-88

FREQUENCY (MHZ) 4.70
V-ANT. LENGTH (FT) 75D
MODE UNBALANCED
DB MAX +2.9
DB MIN −17.1

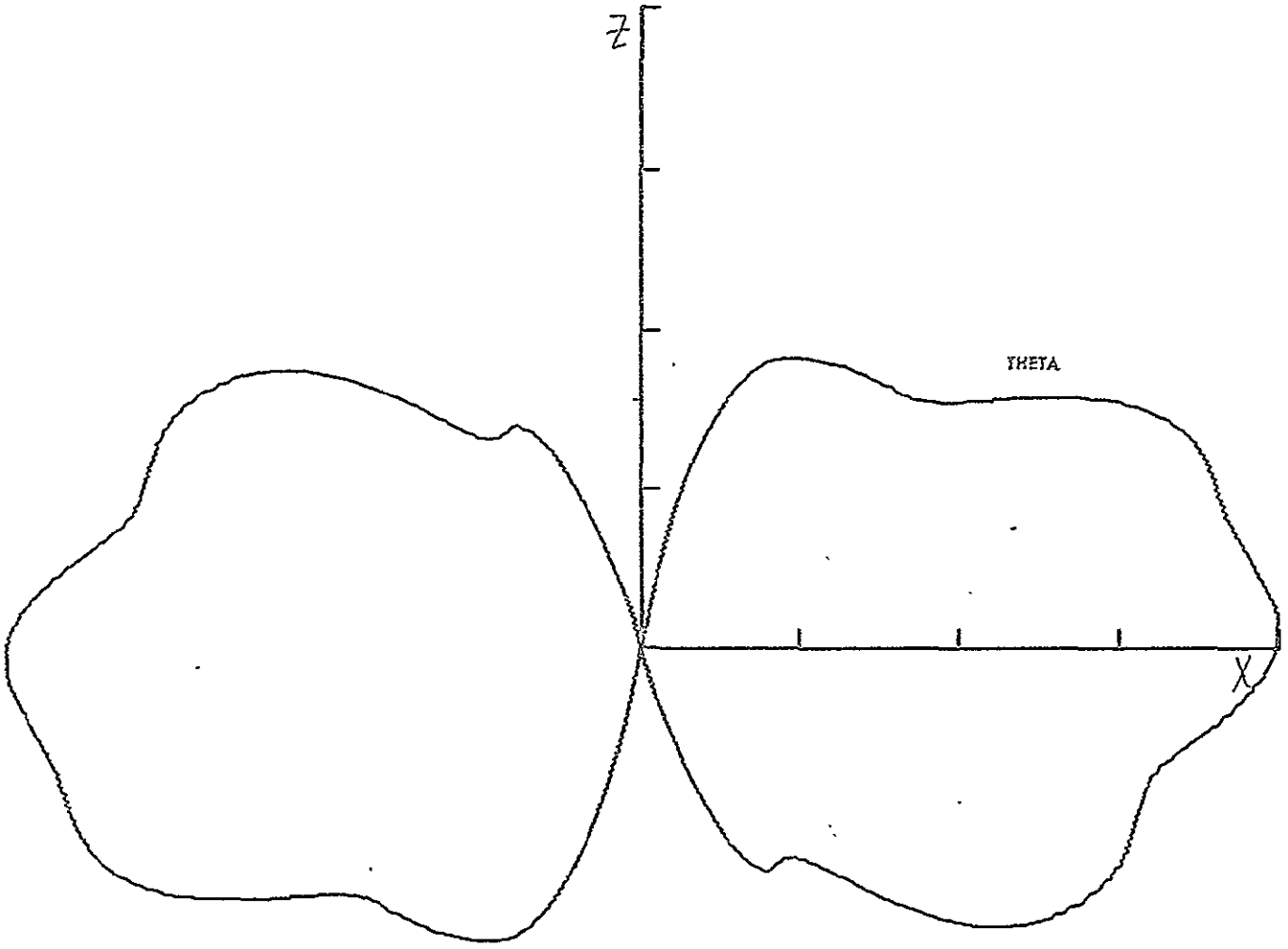

FIGURE B-89

FREQUENCY (MHZ) 6.55
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX + 3.3
DB MIN -16.7

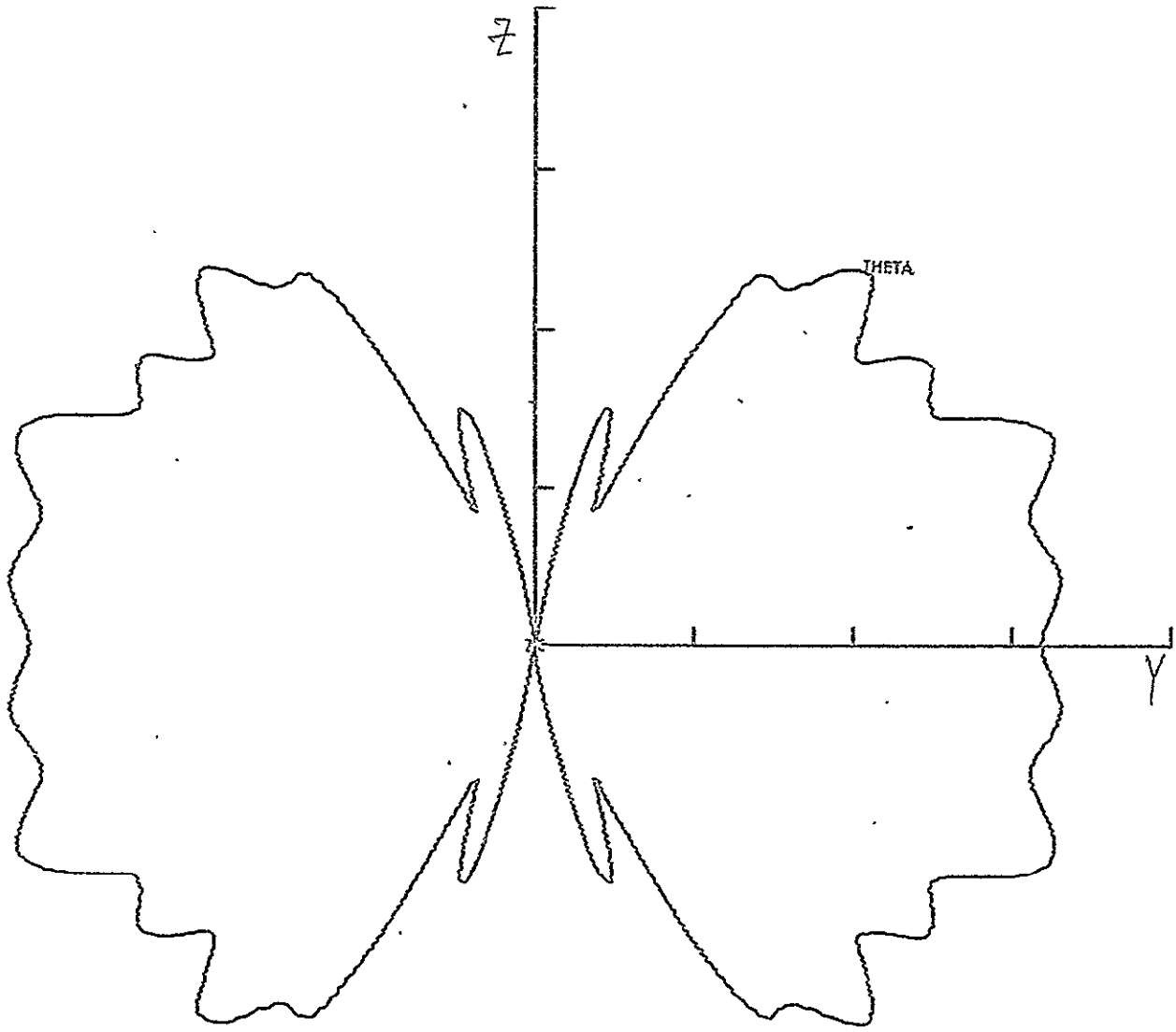

FIGURE B-90

FREQUENCY (MHZ), 6.55
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX + 3.3
DB MIN -16.7

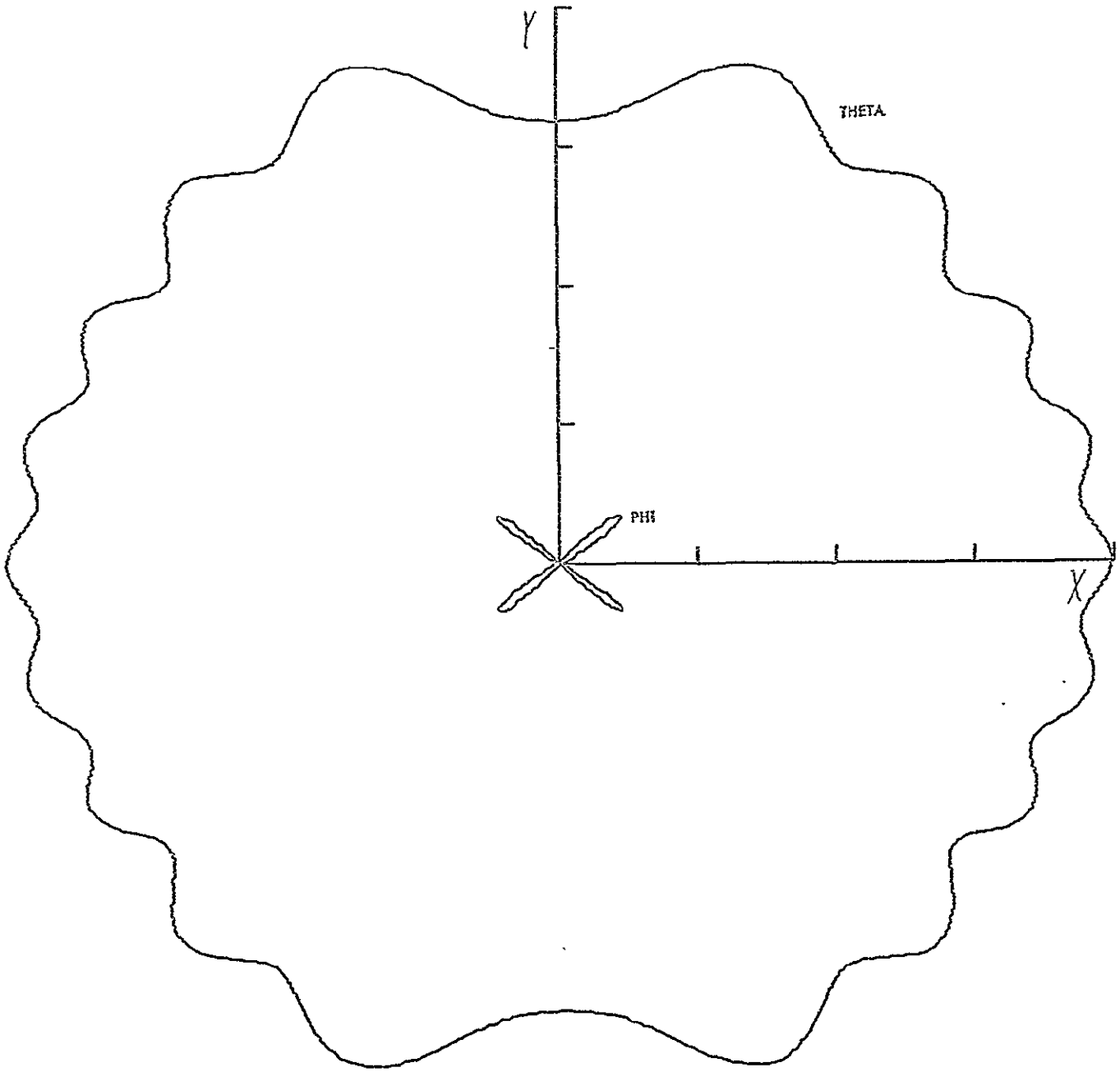

FIGURE B-91

FREQUENCY (MHZ) 6.55
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX + 3.3
DB MIN -16.7

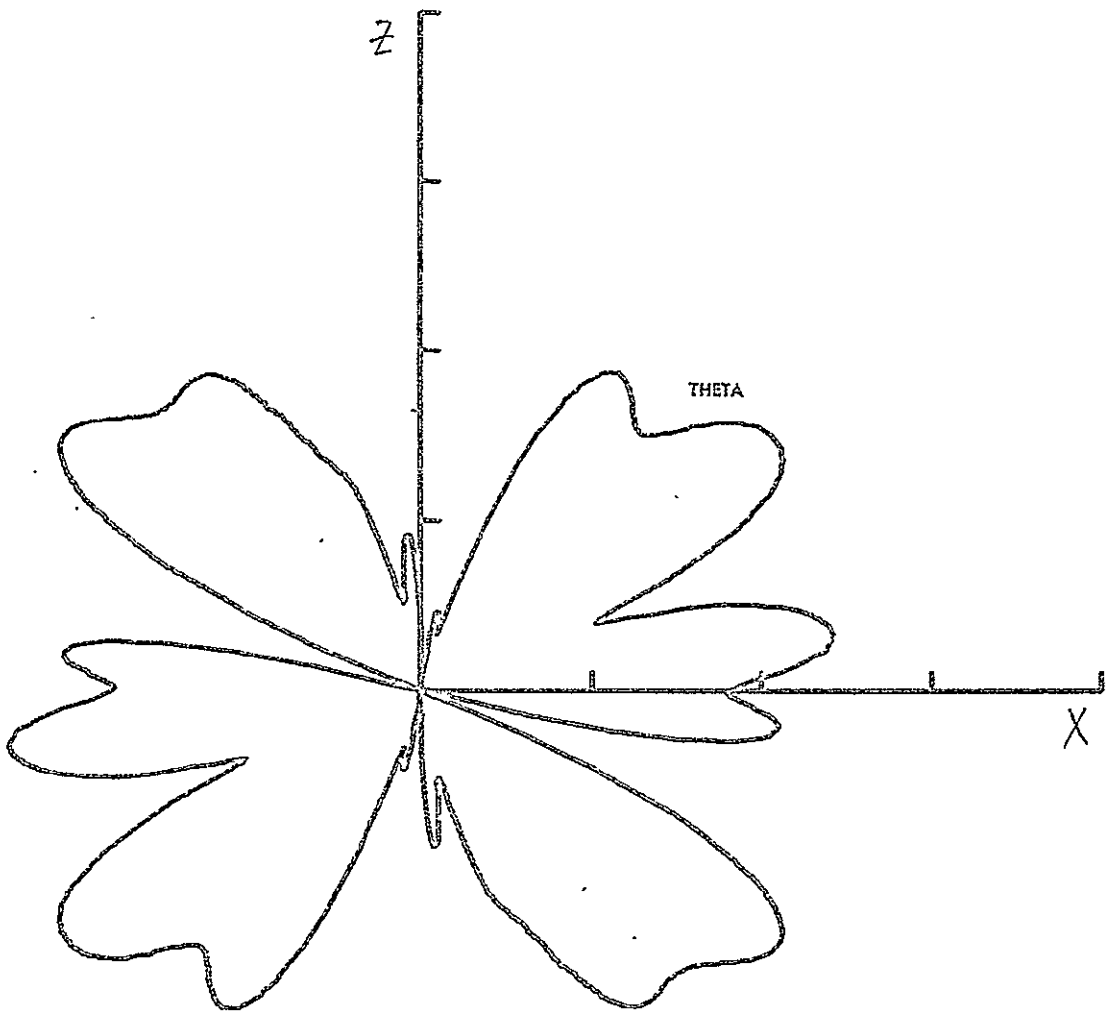

FIGURE B-92

FREQUENCY (MHZ) 6.55
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX + 3.3
DB MIN - 16.7

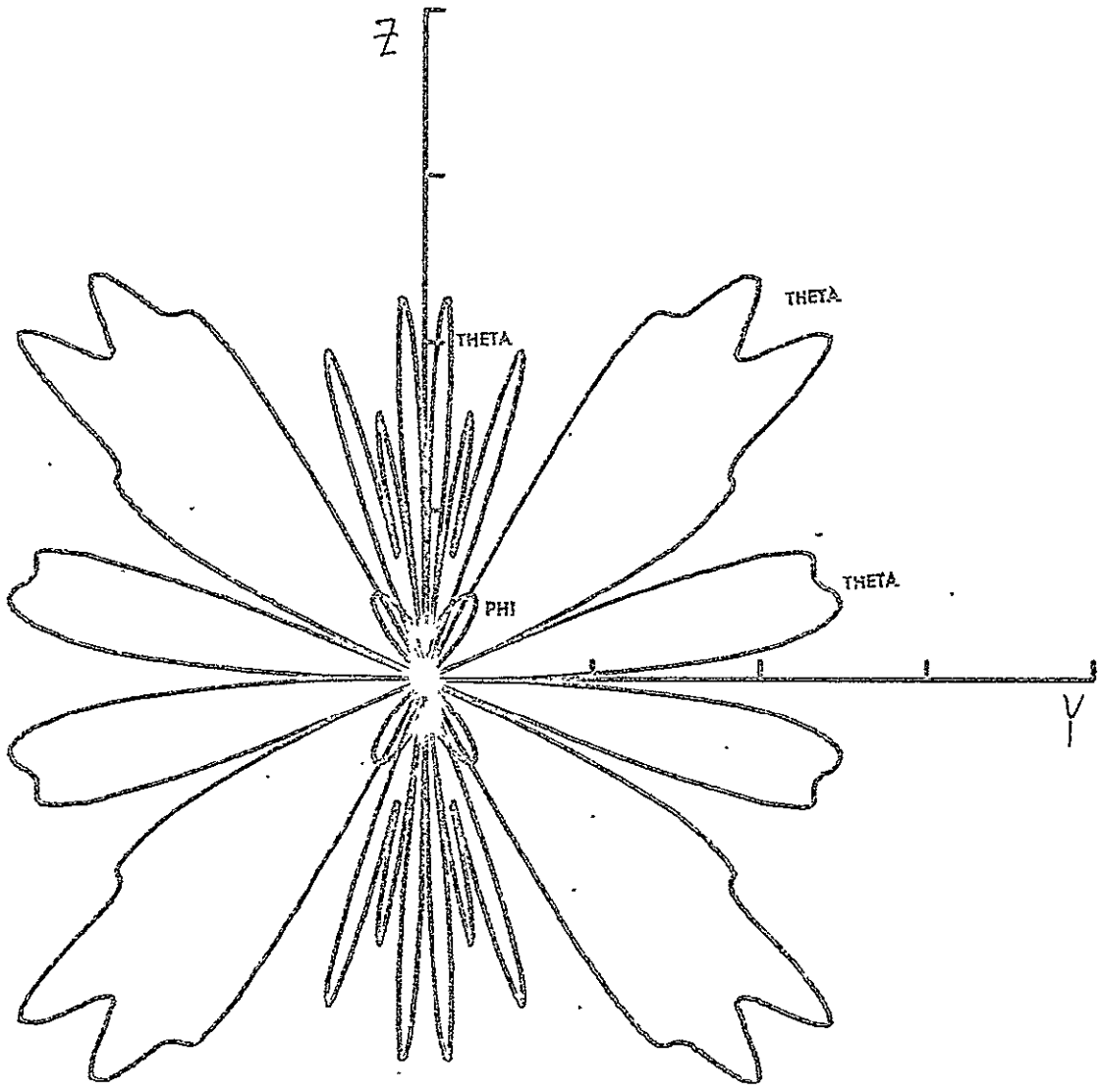

FIGURE B-93

FREQUENCY (MHZ) 6.55
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX + 3.3
DB MIN -16.7

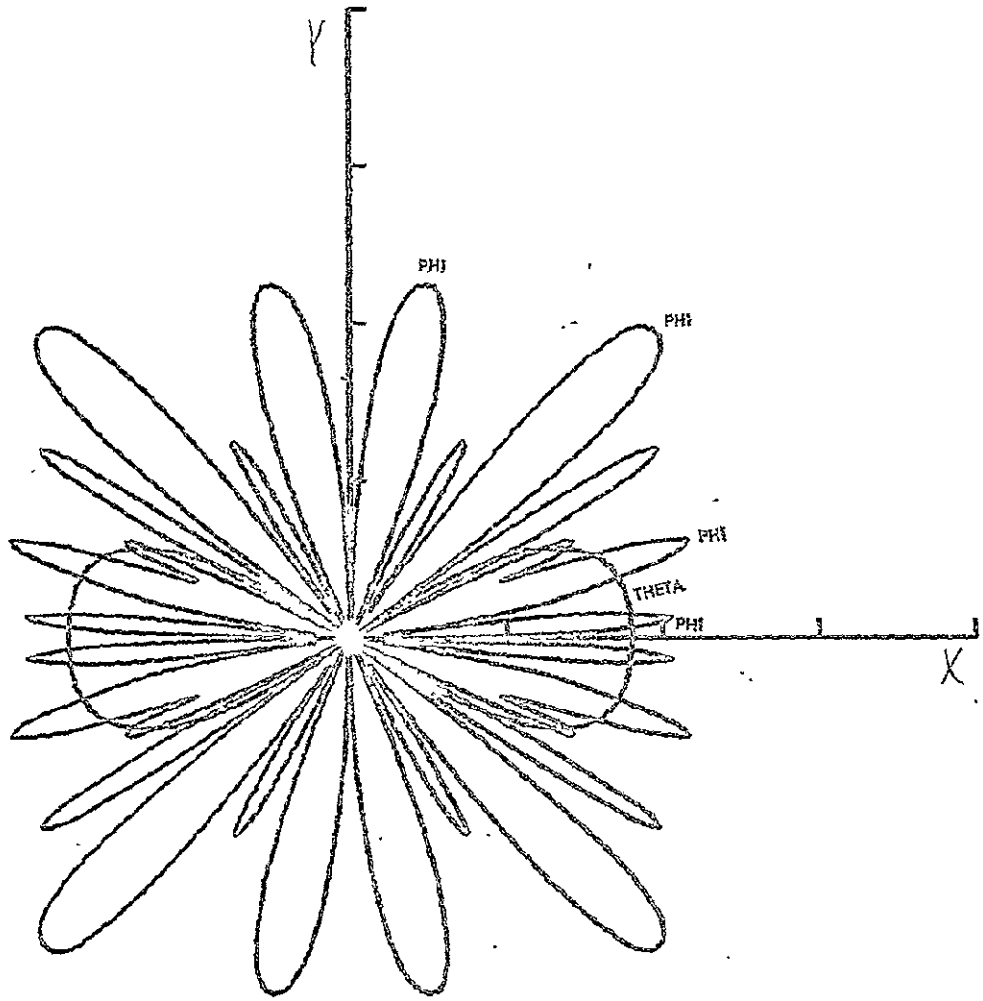

FIGURE B-94

FREQUENCY (MHZ) 6.55
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX + 3.3
DB MIN -16.7

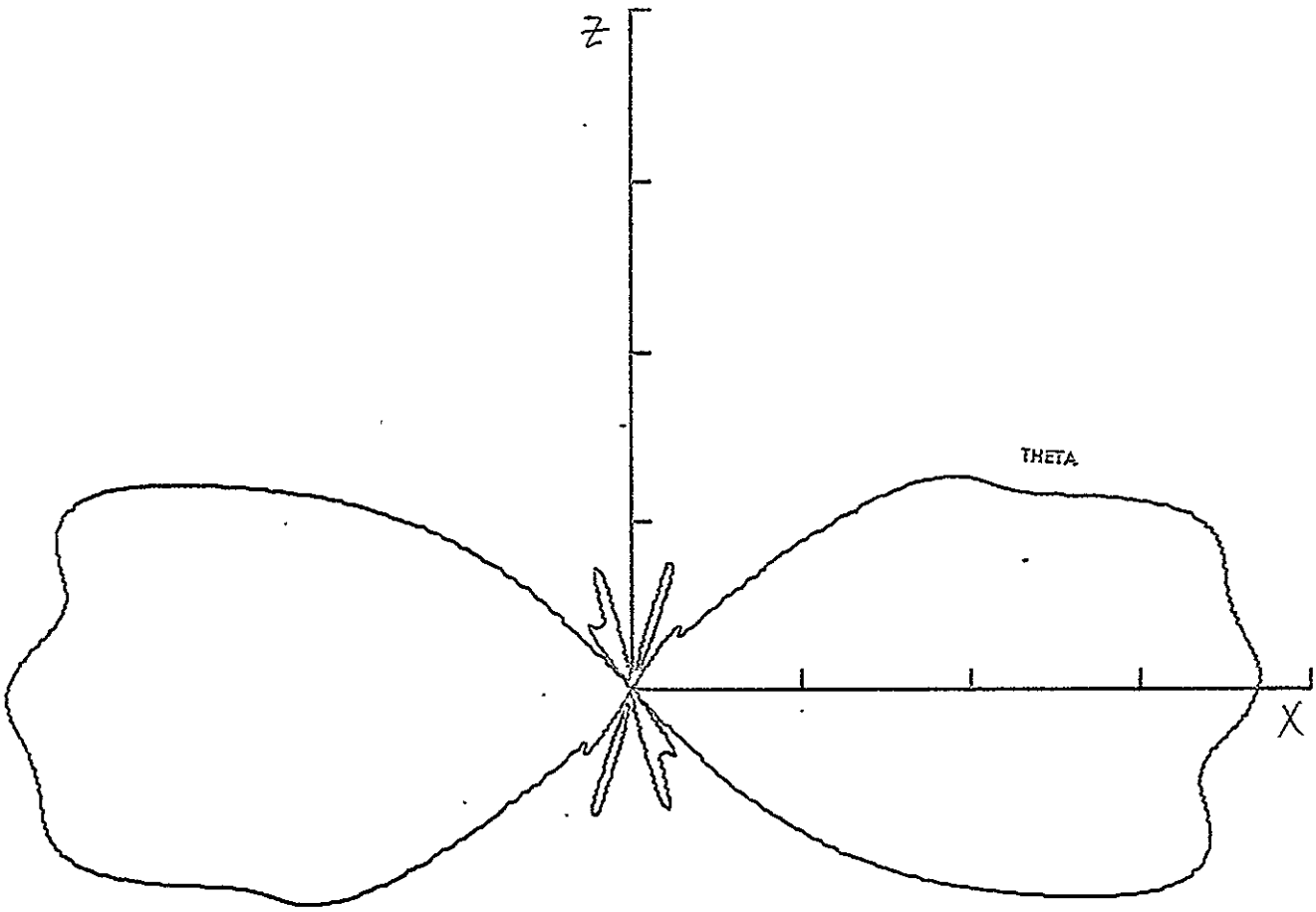

FIGURE B-95

FREQUENCY (MHZ) 9.18
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX + 4.9
DB MIN -15.1

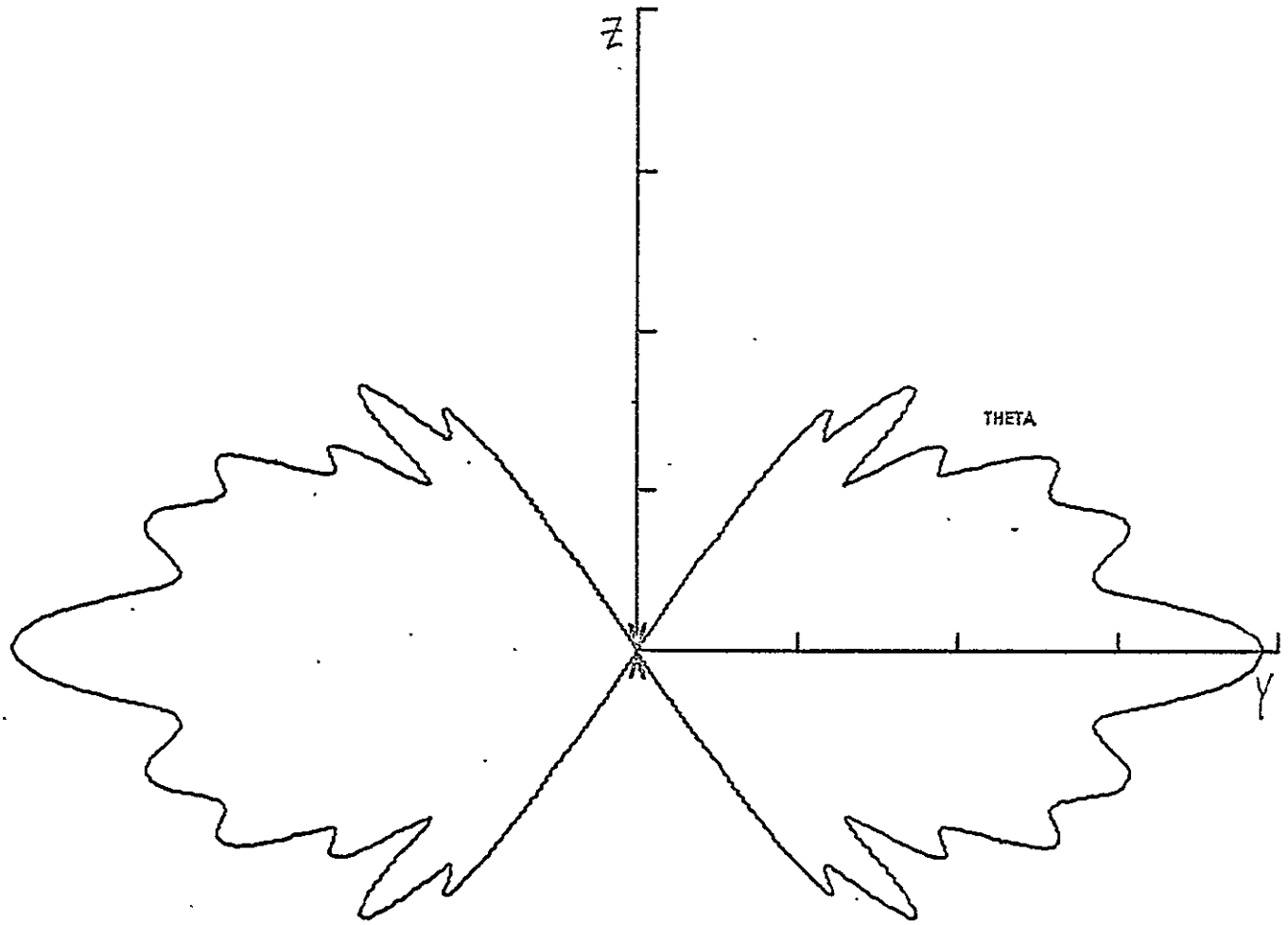

FIGURE B-96

FREQUENCY (MHZ) 9.18
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX + 4.9
DB MIN -15.1

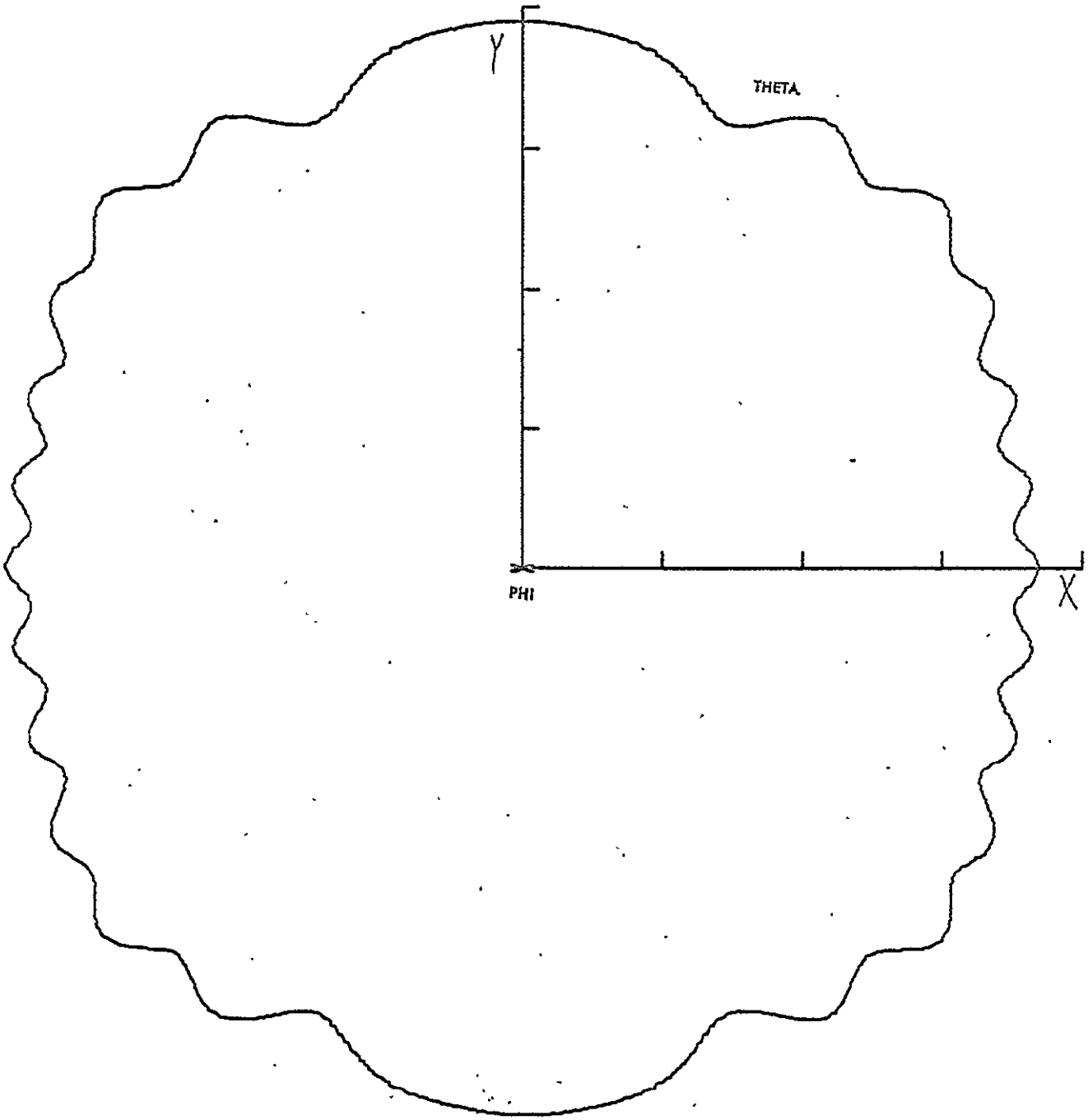

FIGURE B-97

FREQUENCY (MHZ) 9.18
V-ANT. LENGTH (FT) 750
MODE BALANCED
DB MAX + 4.9
DB MIN - 15.1

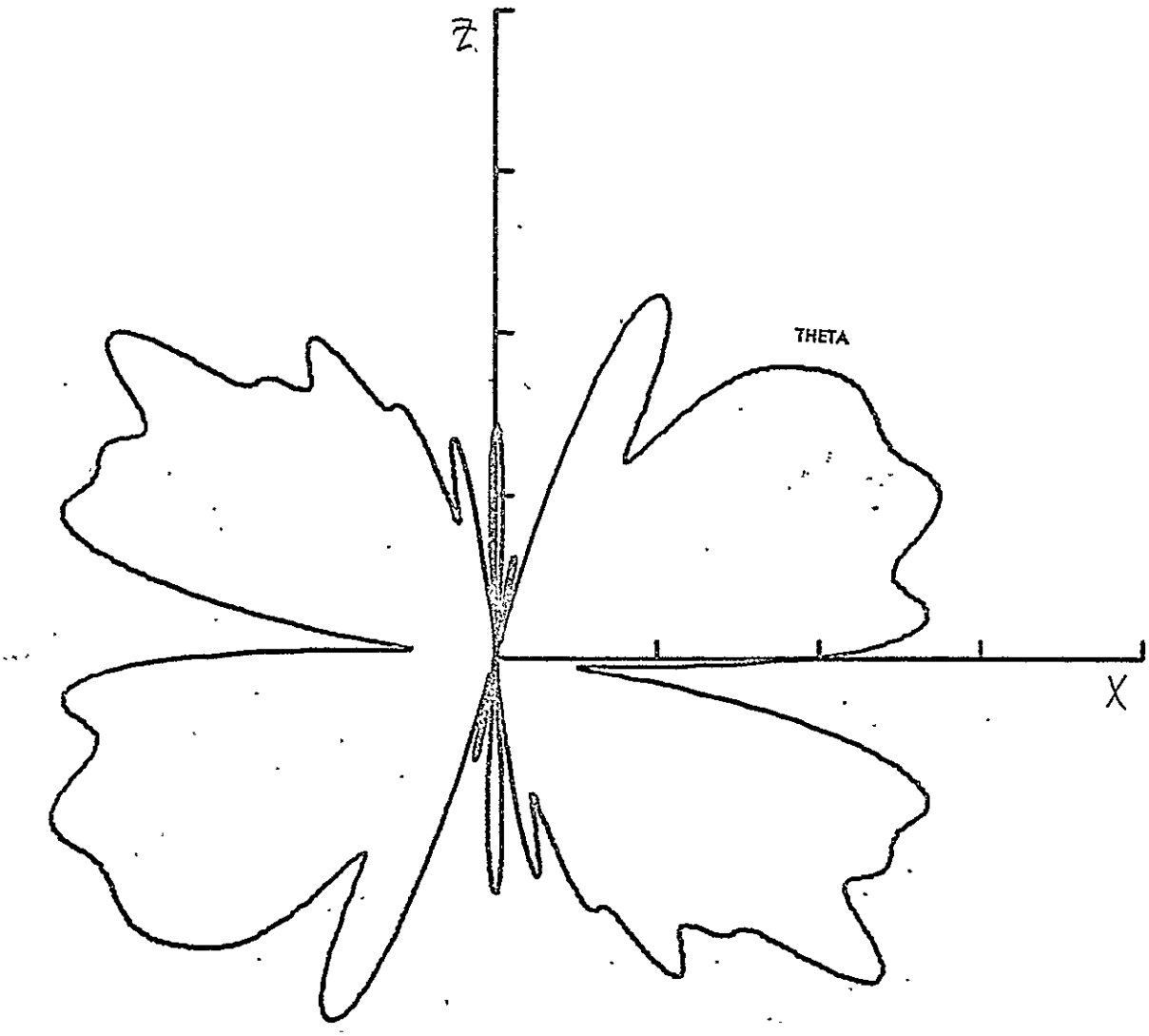

FIGURE B-98

FREQUENCY (MHZ) 9.18
V-ANT. LENGTH (FT) 950
MODE UNBALANCED
DB MAX + 4.9
DB MIN -15.1

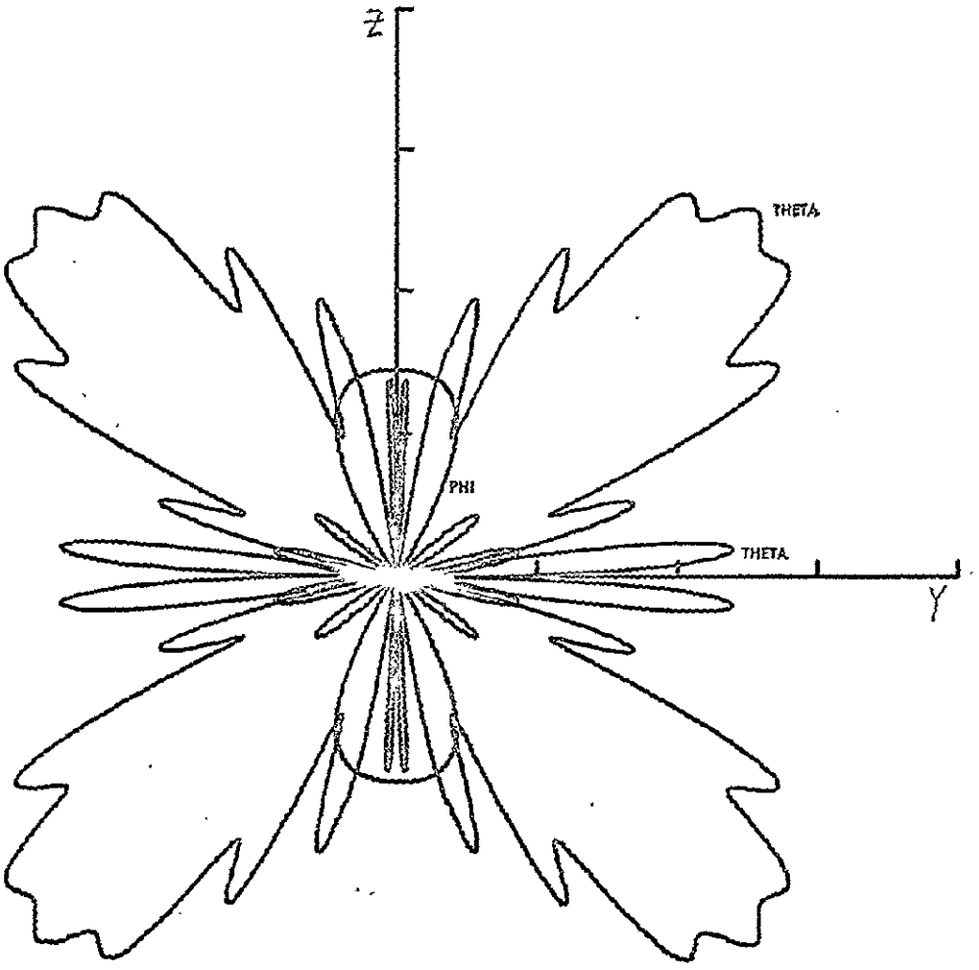

FIGURE B-99

FREQUENCY (MHZ) 9.18
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX + 4.9
DB MIN − 15.1

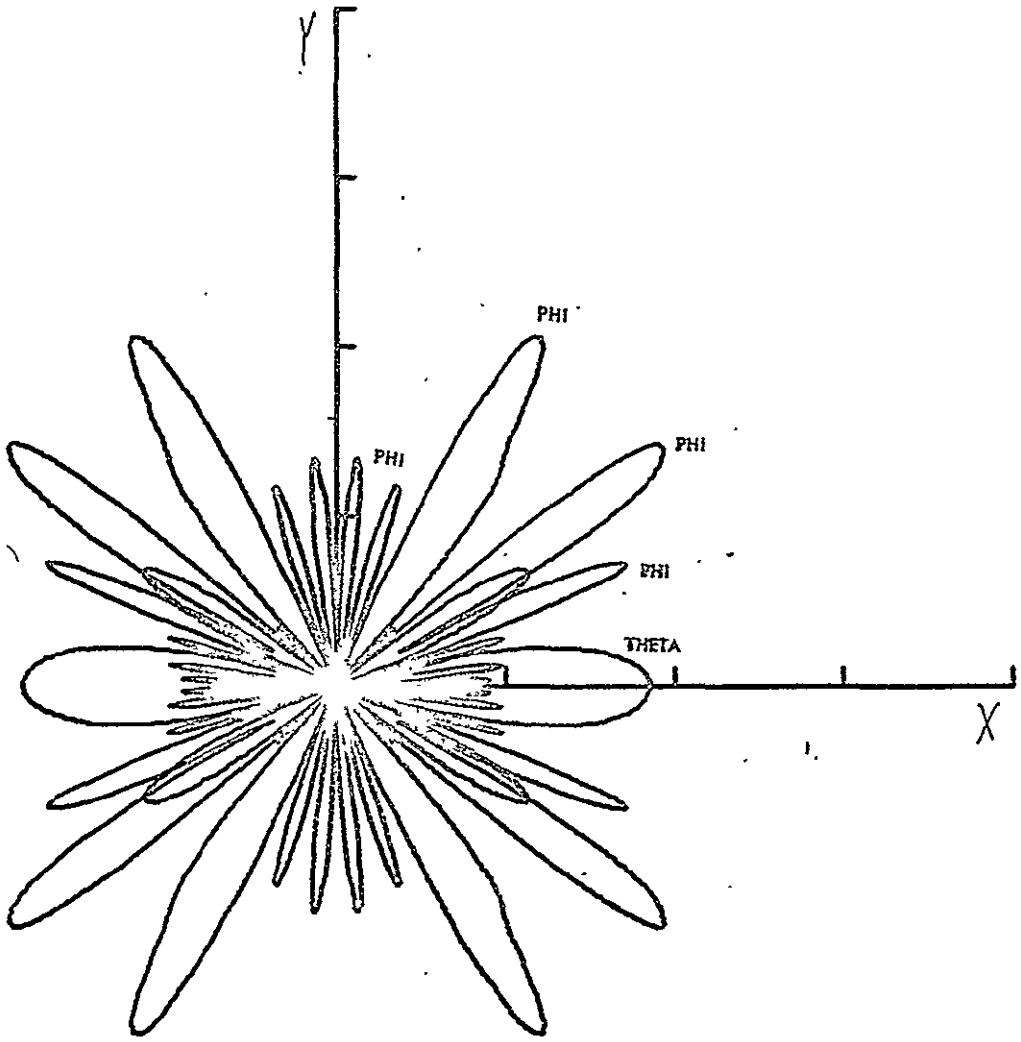

FIGURE B-100

FREQUENCY (MHZ) 9.18
V-ANT. LENGTH (FT) 750
MODE UNBALANCED
DB MAX + 4.9
DB MIN - 15.1

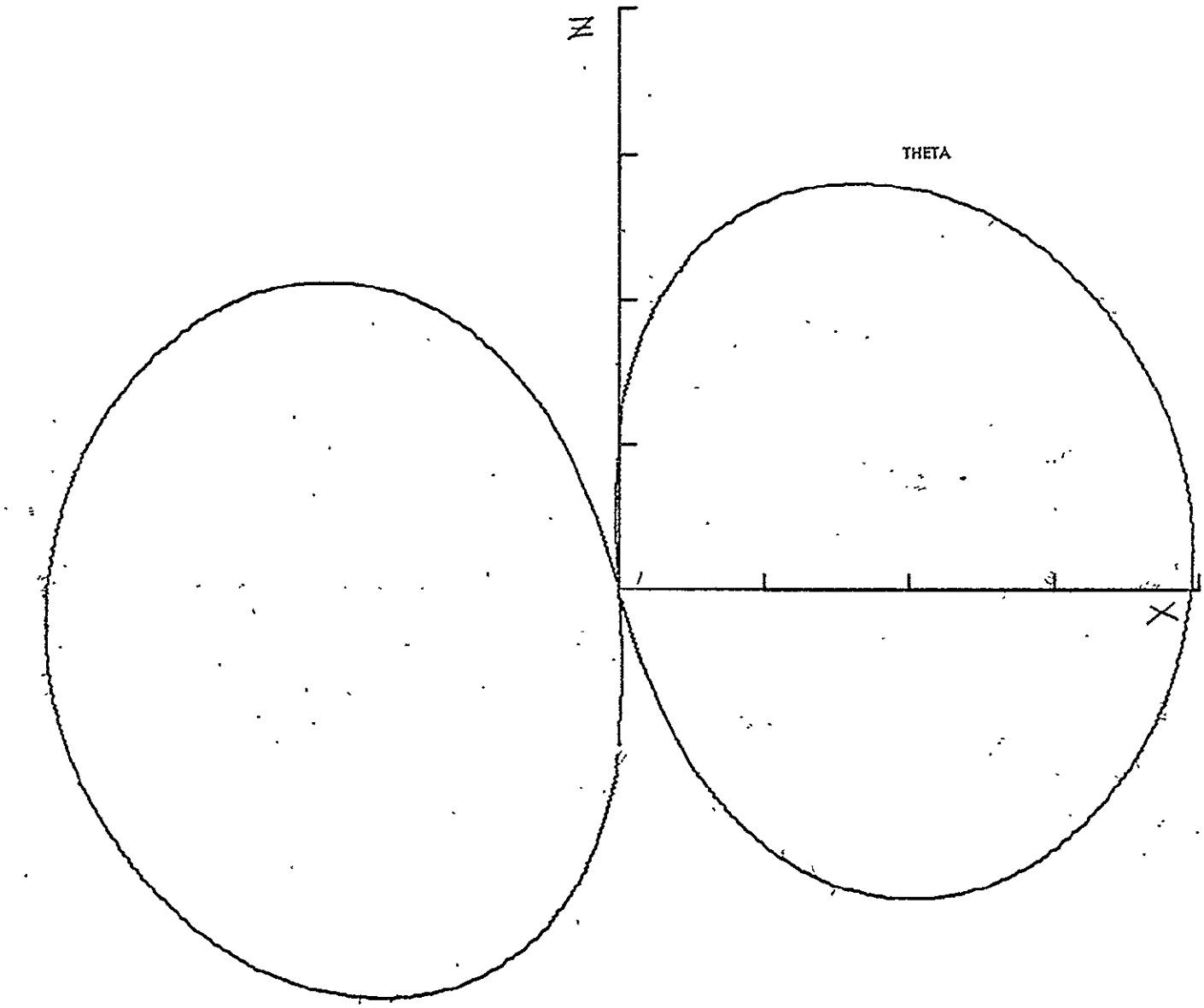

FIGURE B-101

FREQUENCY (MHZ) .202
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX -18.7
DB MIN -38.7

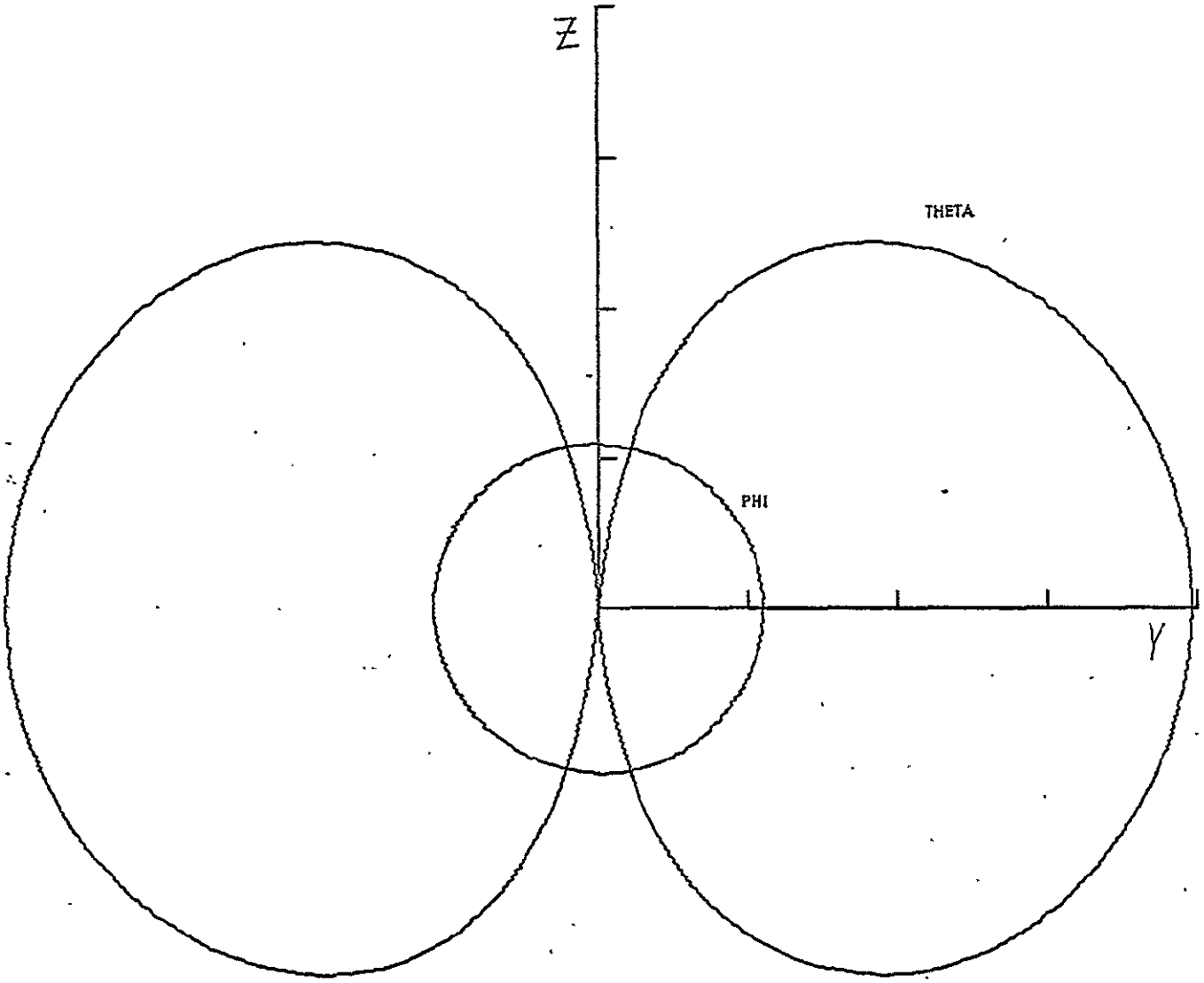

FIGURE B-102

FREQUENCY (MHZ) .202
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX -18.7
DB MIN -38.7

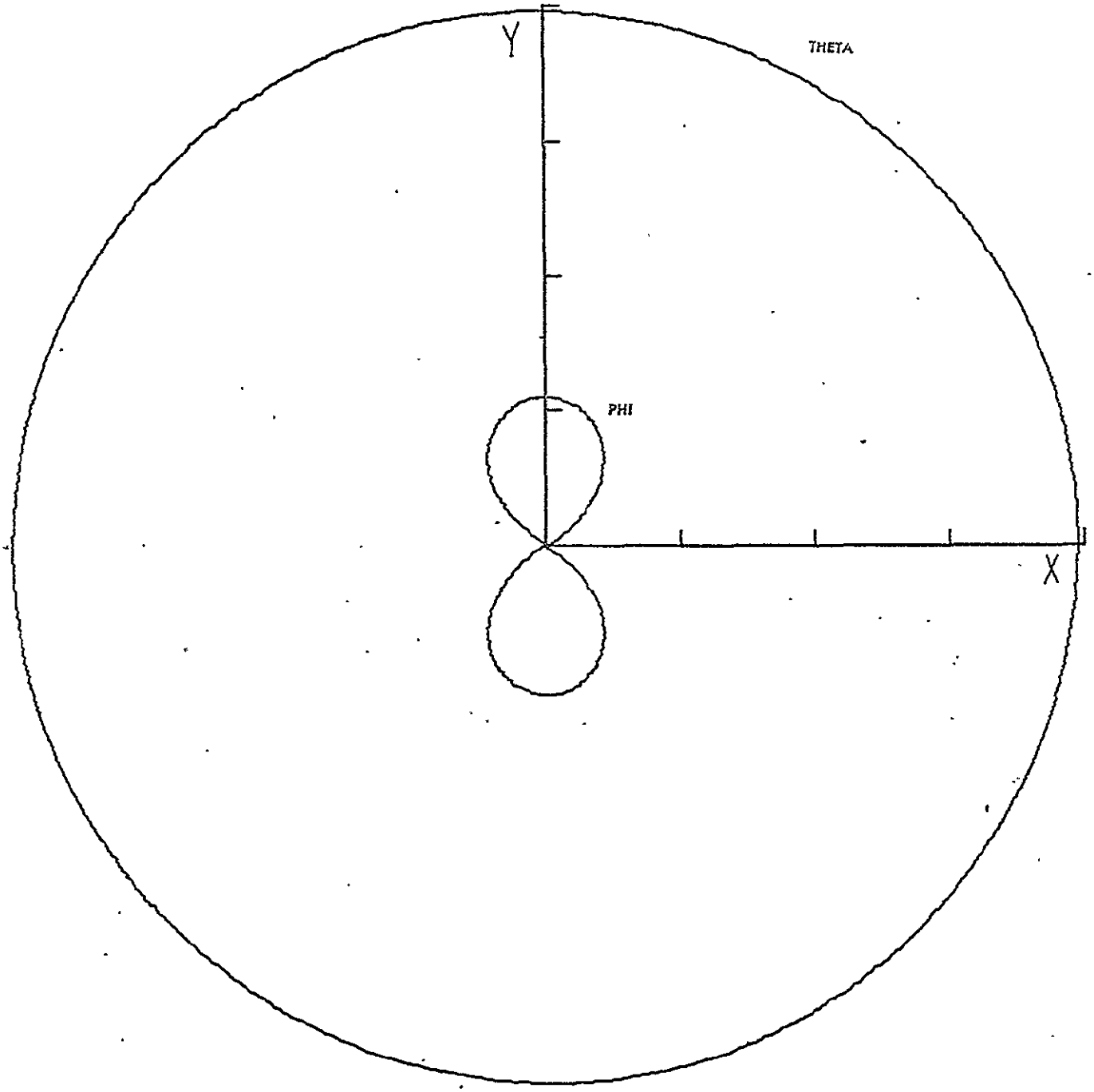

FIGURE B-103

FREQUENCY (MHZ) .202
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX -18.7
DB MIN -38.7

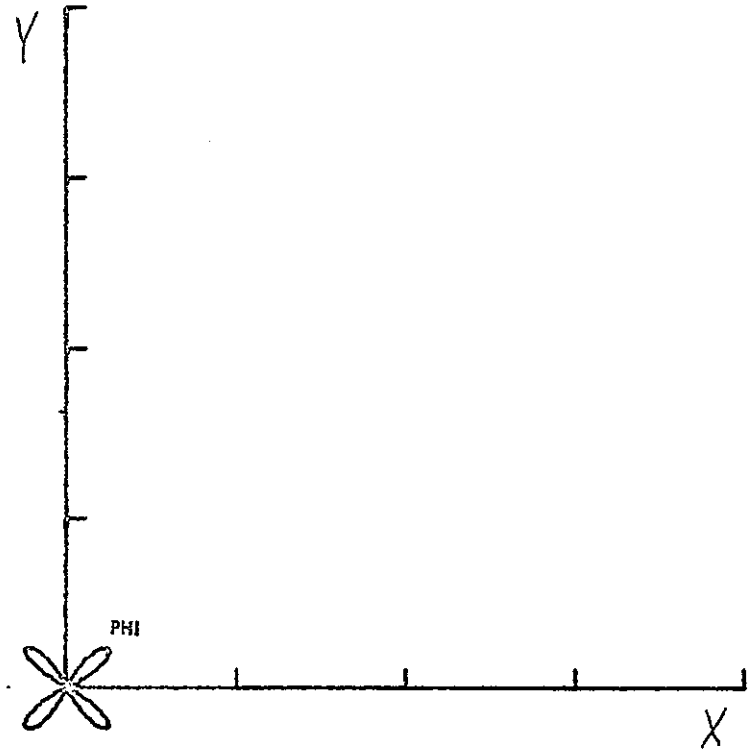

FIGURE B-104

FREQUENCY (MHZ) .202
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX -18.7
DB MIN -38.7

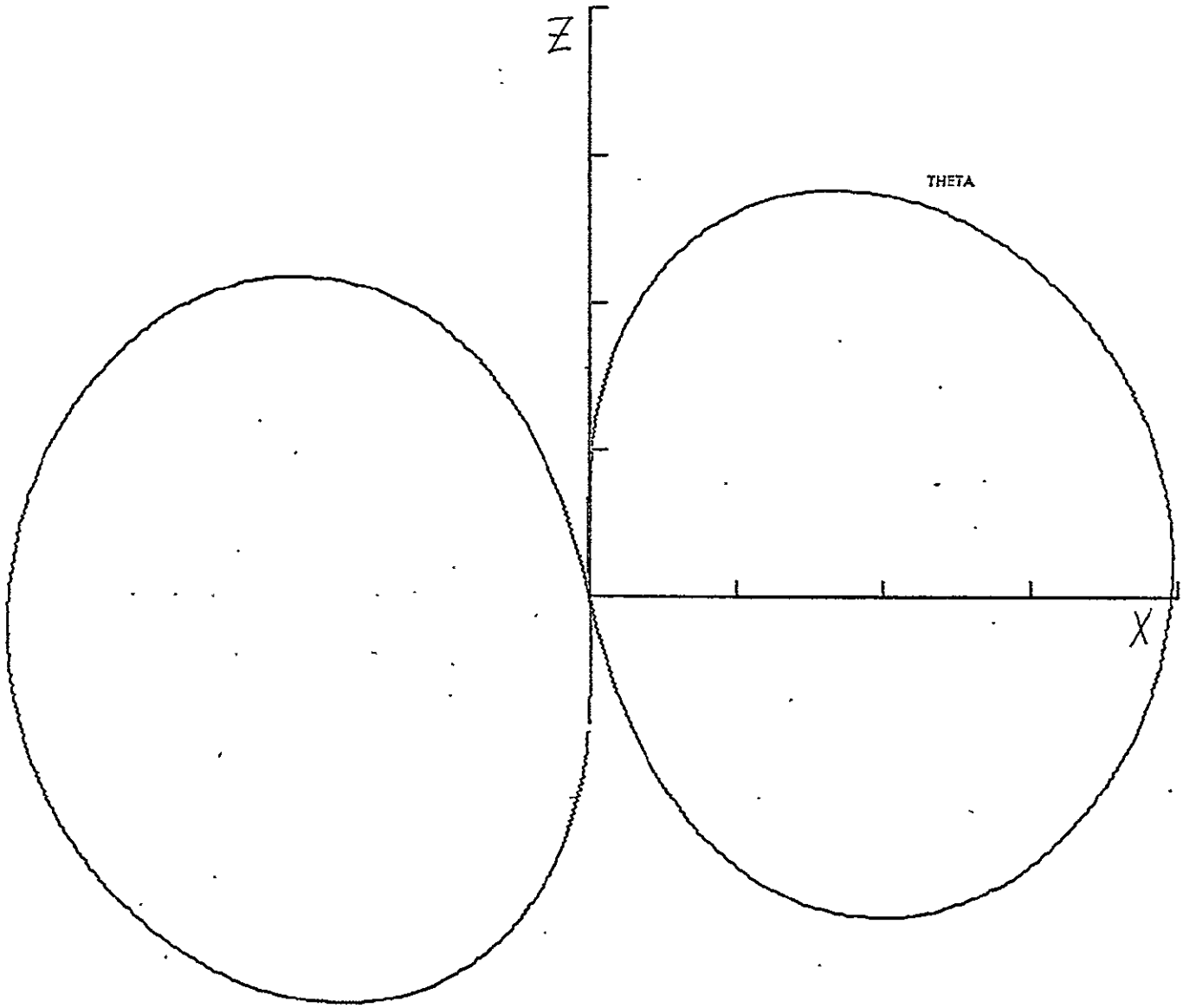

FIGURE B-105

FREQUENCY (MHZ) .311
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX -13.8
DB MIN -33.8

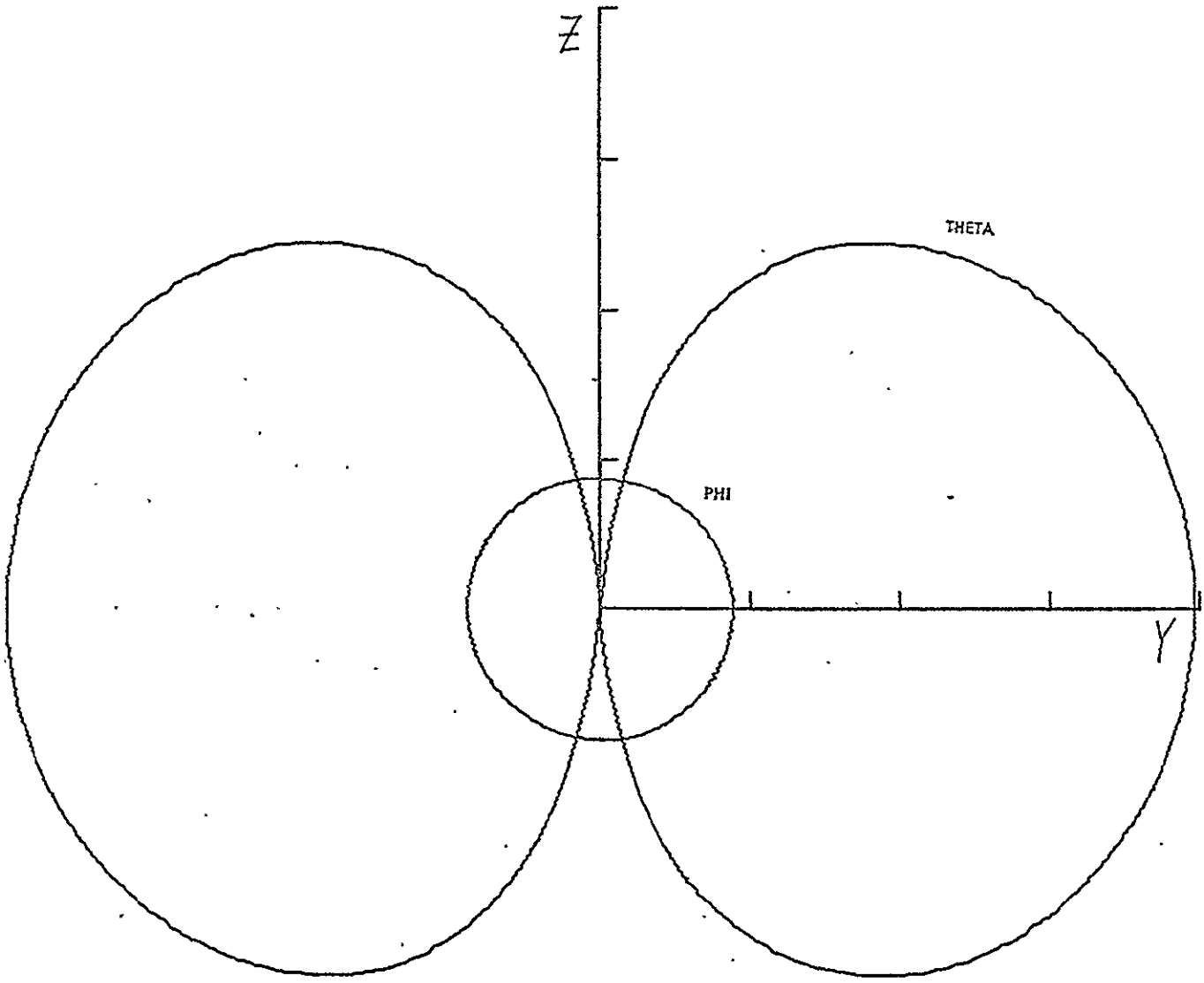

FIGURE B-106

FREQUENCY (MHZ) .311
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX -13.8
DB MIN -33.8

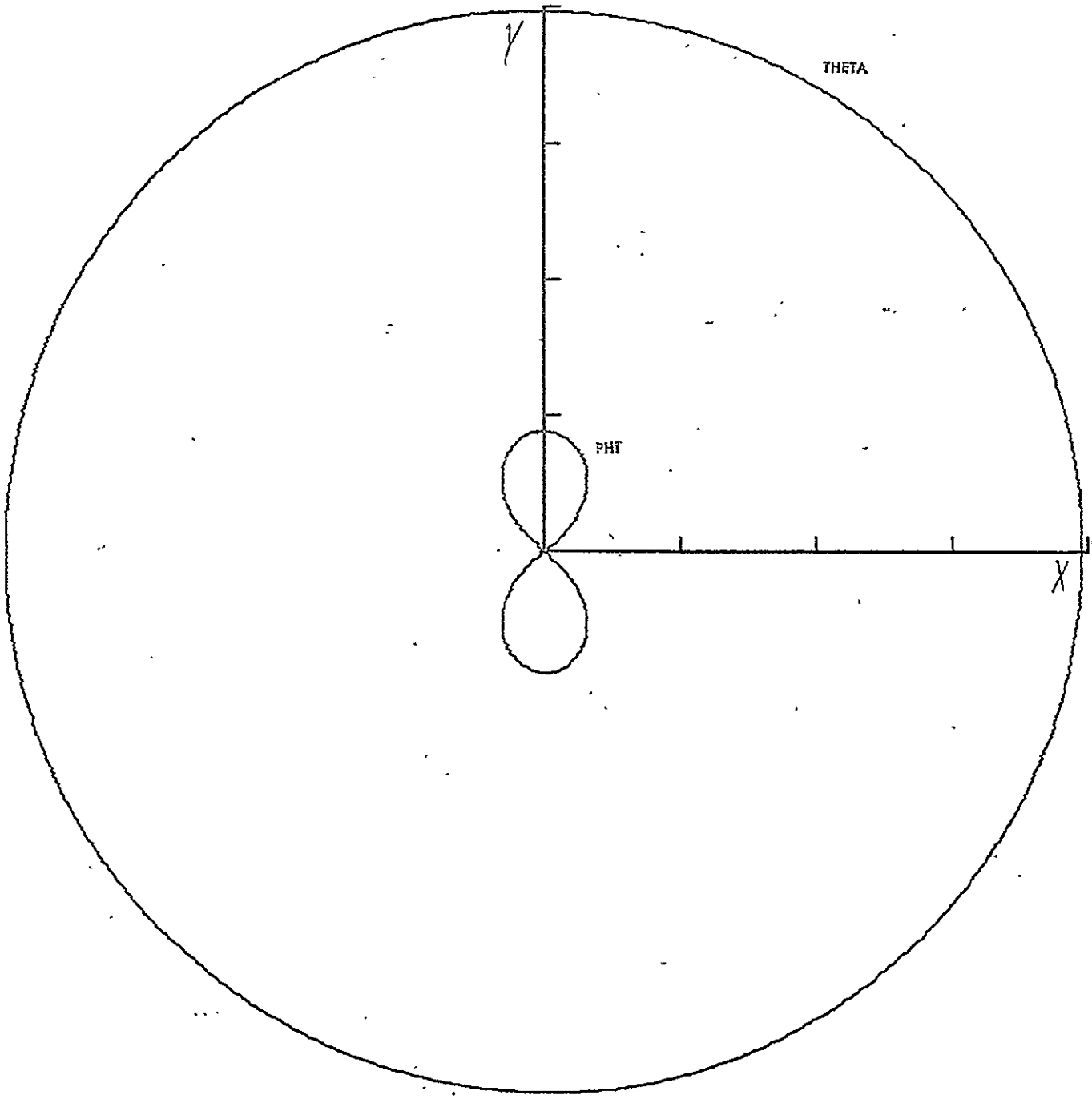

FIGURE B-107

FREQUENCY (MHZ) .311
ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX -13.8
DB MIN -33.8

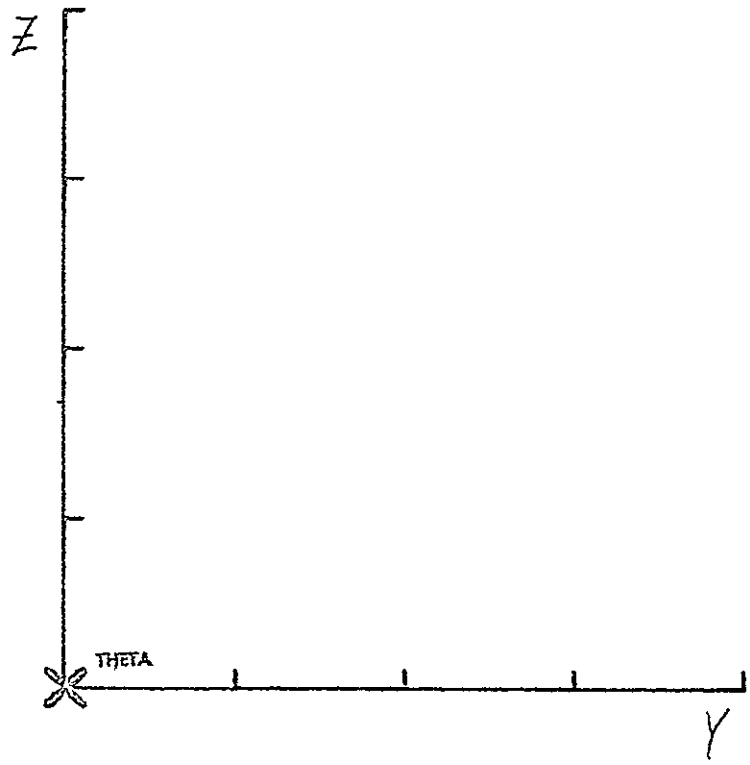

FIGURE B-108

FREQUENCY (MHZ) .311
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX -13.8
DB MIN -39.8

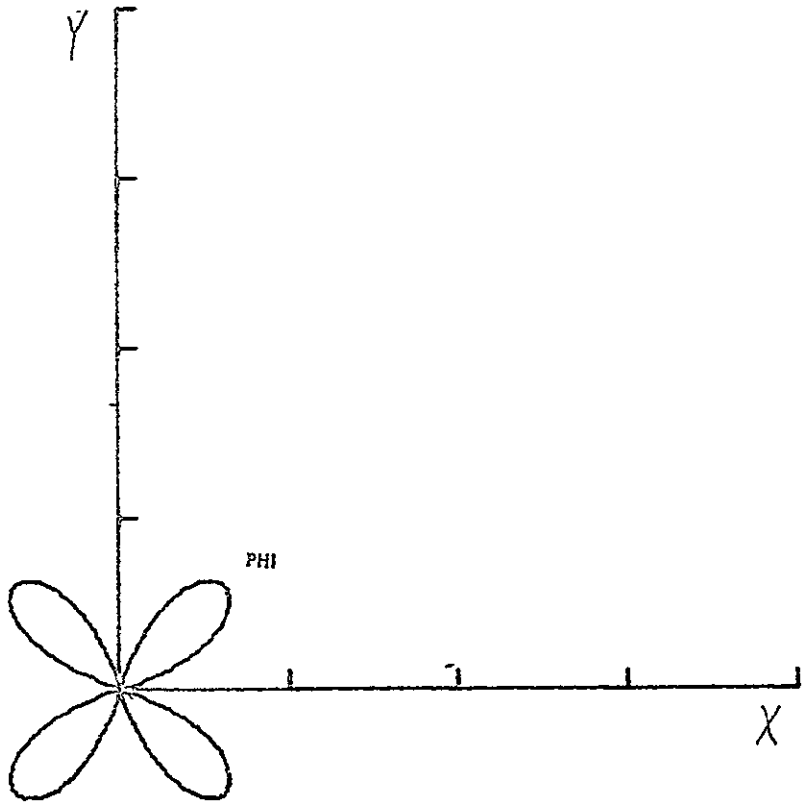

FIGURE B-109

FREQUENCY (MHZ) .311
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX -13.8
DB MIN -33.8

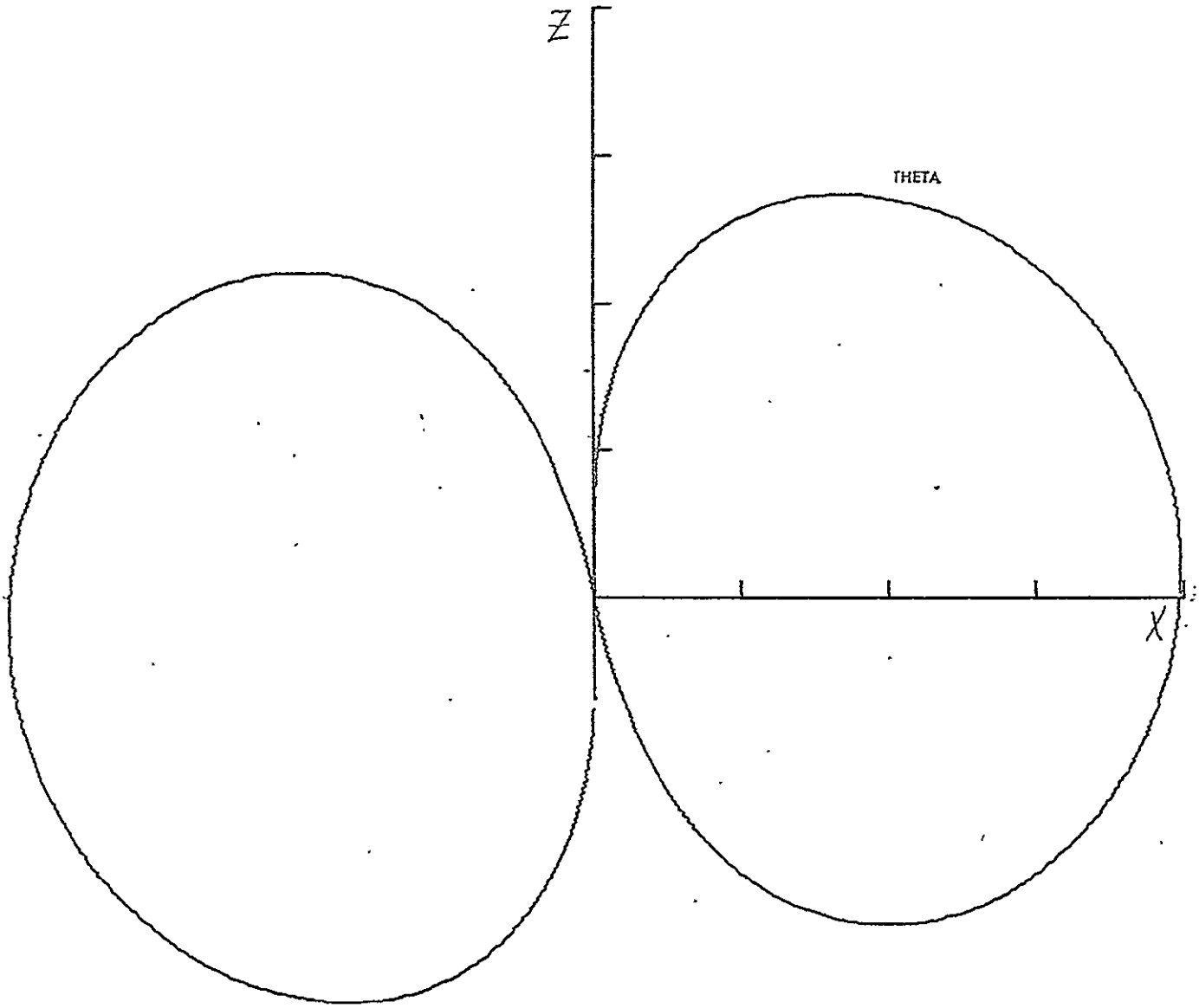

FIGURE B-110

FREQUENCY (MHZ) .369
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX -11.3
DB MIN -31.3

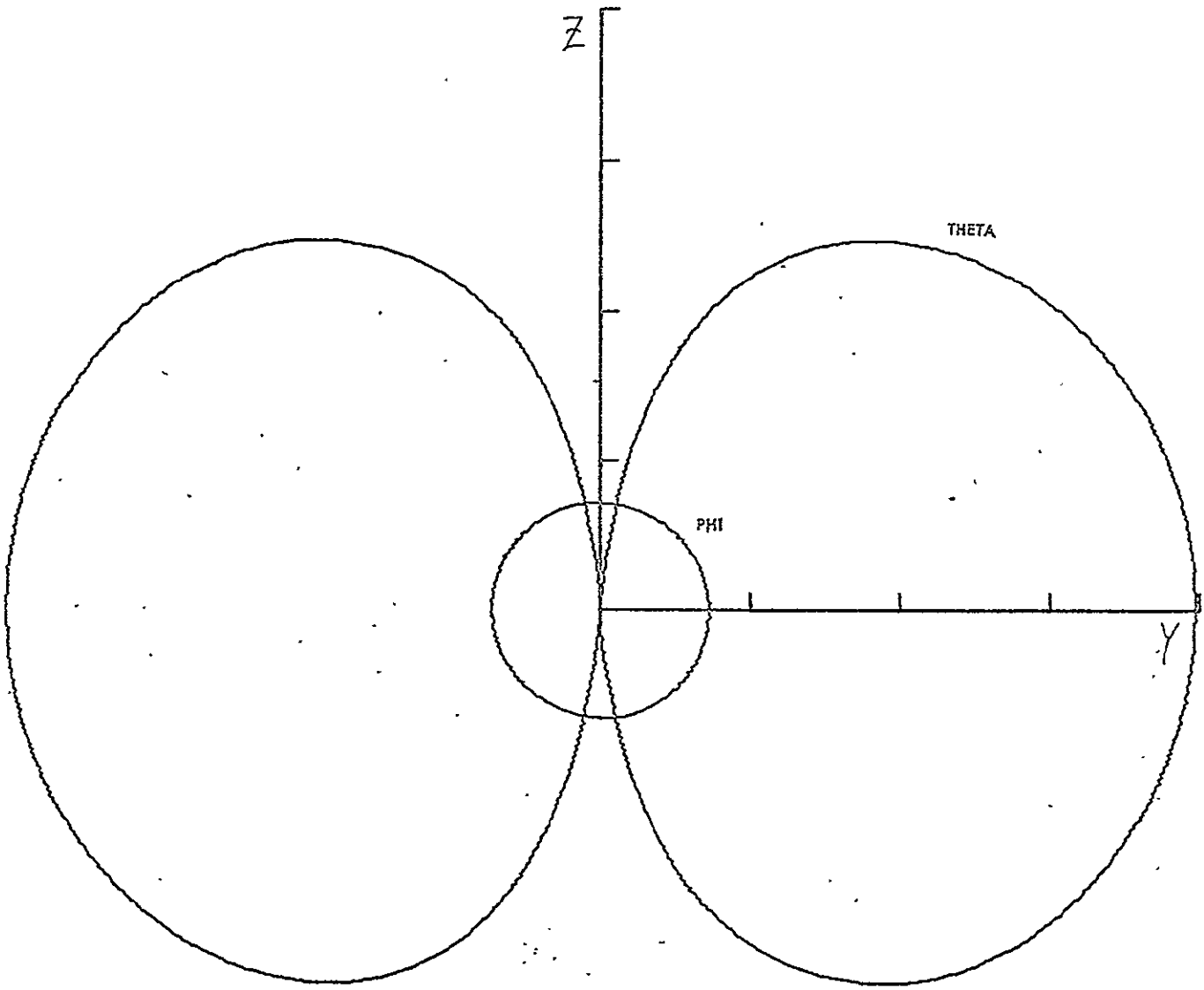

FIGURE B-111

FREQUENCY (MHZ) .369
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX -11.3
DB MIN -31.3

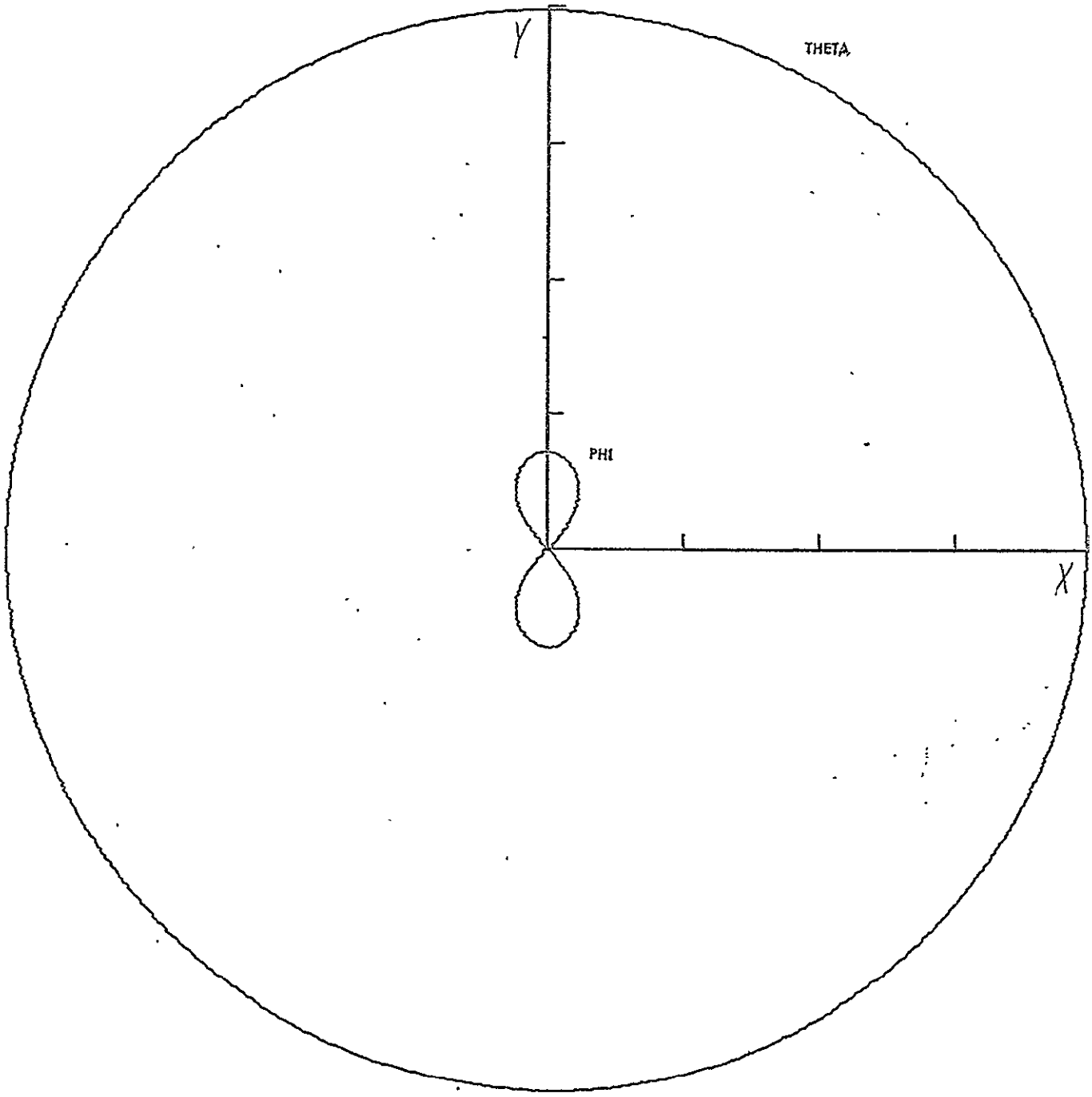

FIGURE B-112

FREQUENCY (MHZ) .369
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX -11.3
DB MIN -31.3

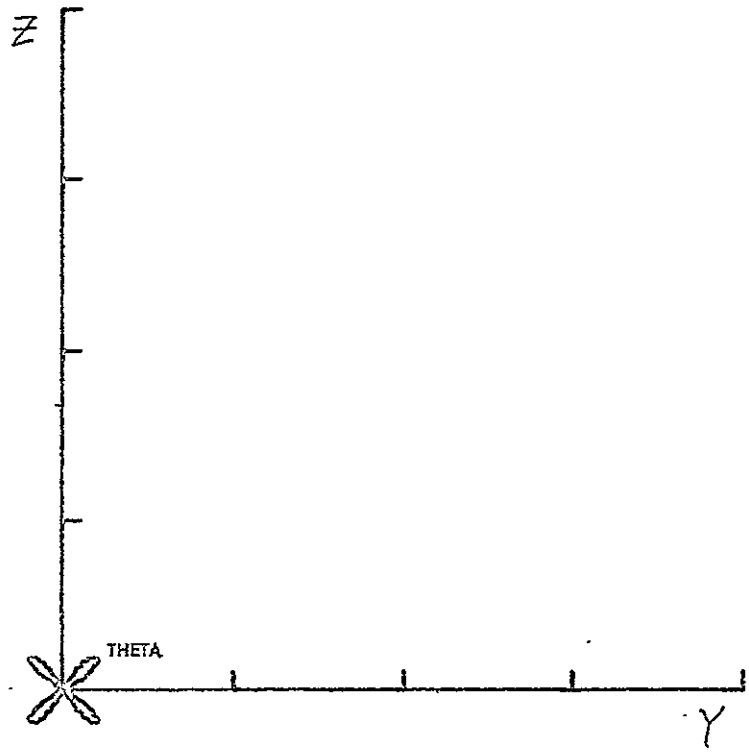

FIGURE B-113

FREQUENCY (MHZ) .369
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX -11.3
DB MIN -31.3

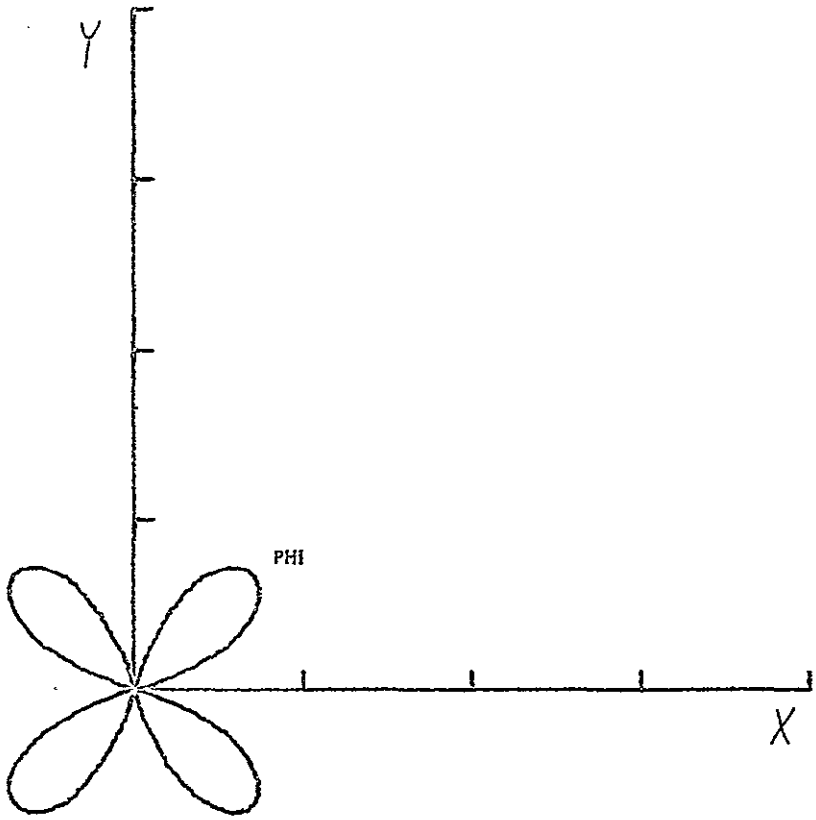

FIGURE B-114

FREQUENCY (MHZ) .369
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX -11.3
DB MIN -31.3

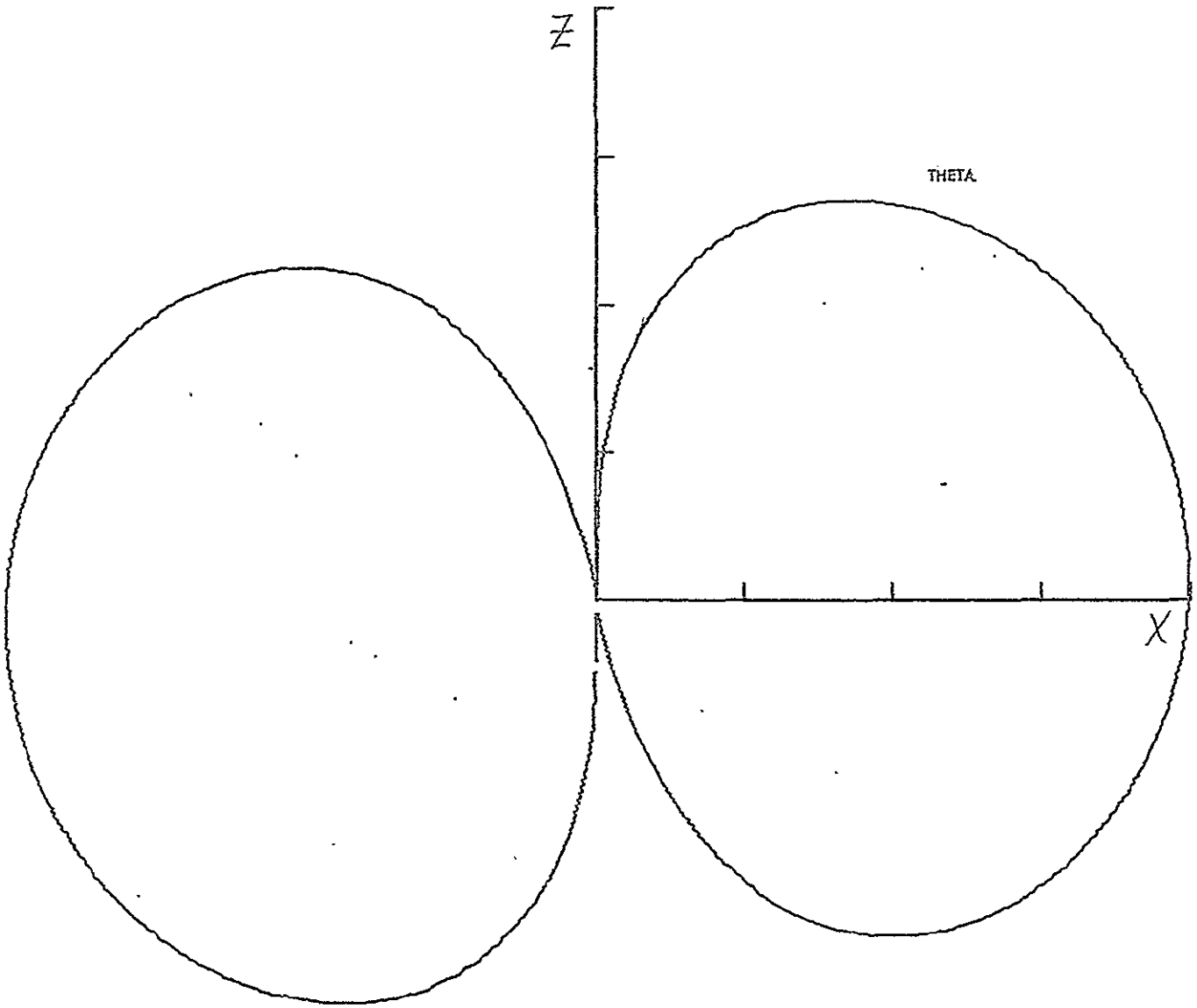

FIGURE B-115

FREQUENCY (MHZ) .450
V-ANT. LENGTH (FT) . 450
MODE BALANCED
DB MAX - 7.8
DB MIN -27.8

50

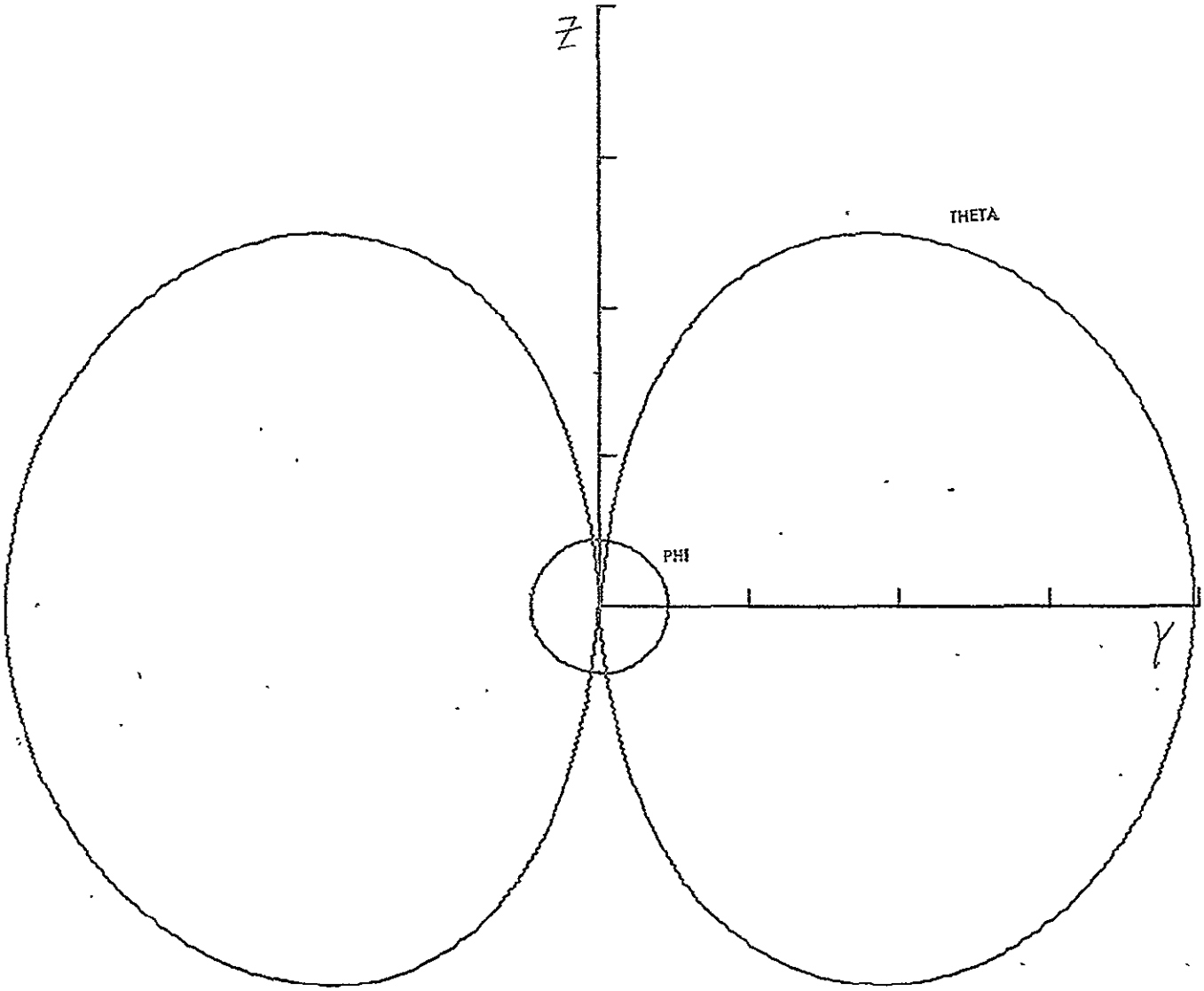

FIGURE B-116

FREQUENCY (MHZ) .450
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX — 7.8
DB MIN — 27.8

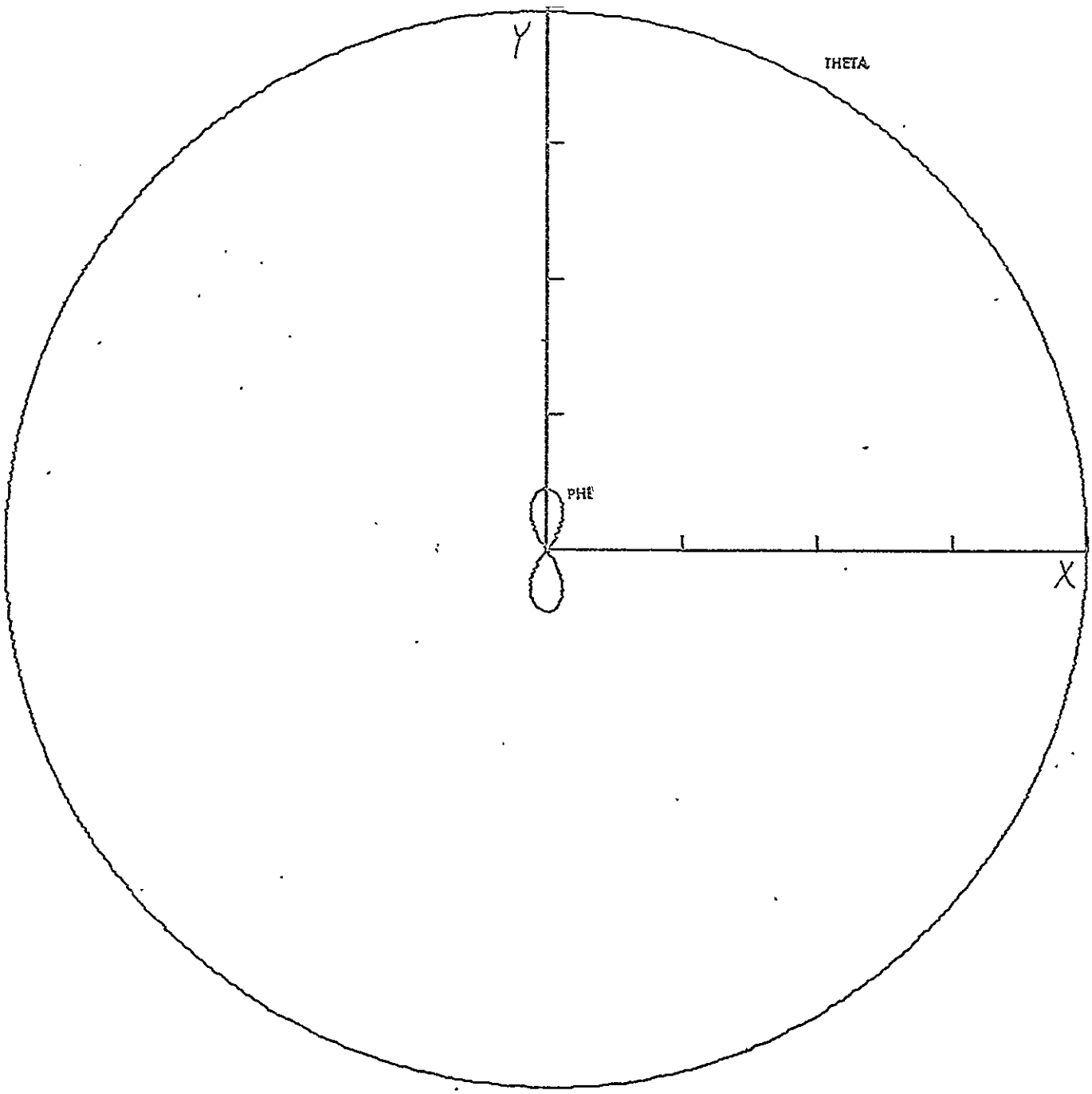

FIGURE B-117

FREQUENCY (MHZ) .450
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX - 7.8
DB MIN -27.8

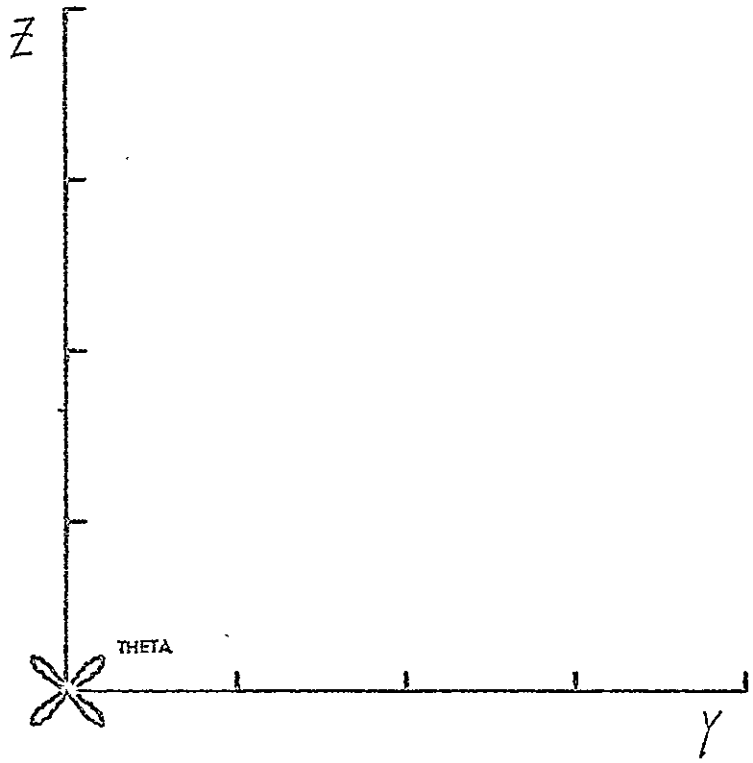

FIGURE B-118

FREQUENCY (MHZ) .450
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX - 7.8
DB MIN -27.8

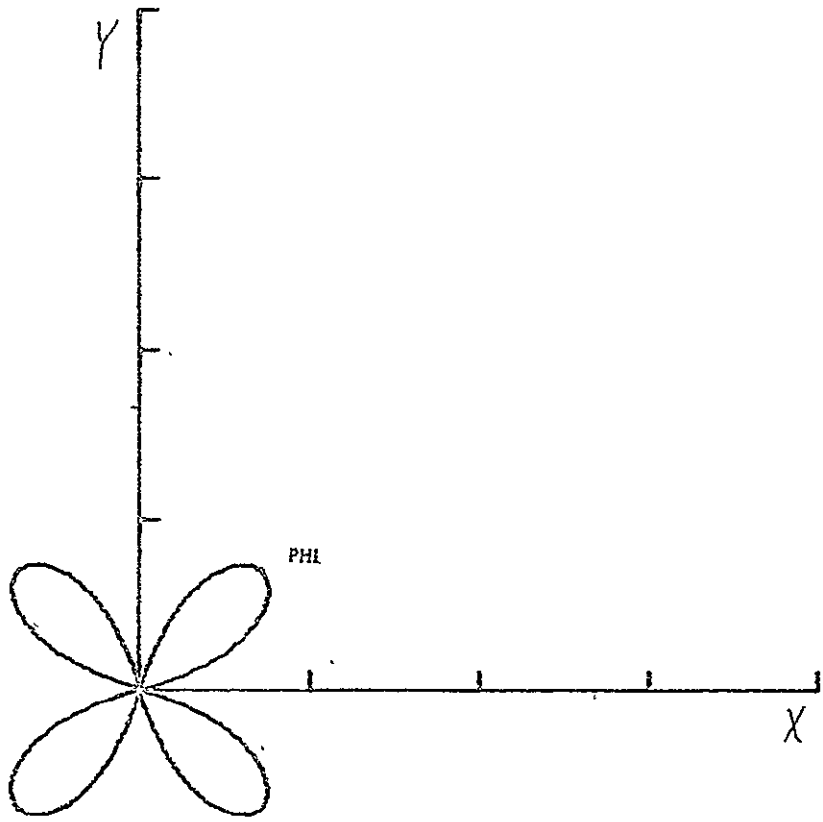

FIGURE B-119

FREQUENCY (MHZ) .450
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX - 7.8
DB MIN -27.8

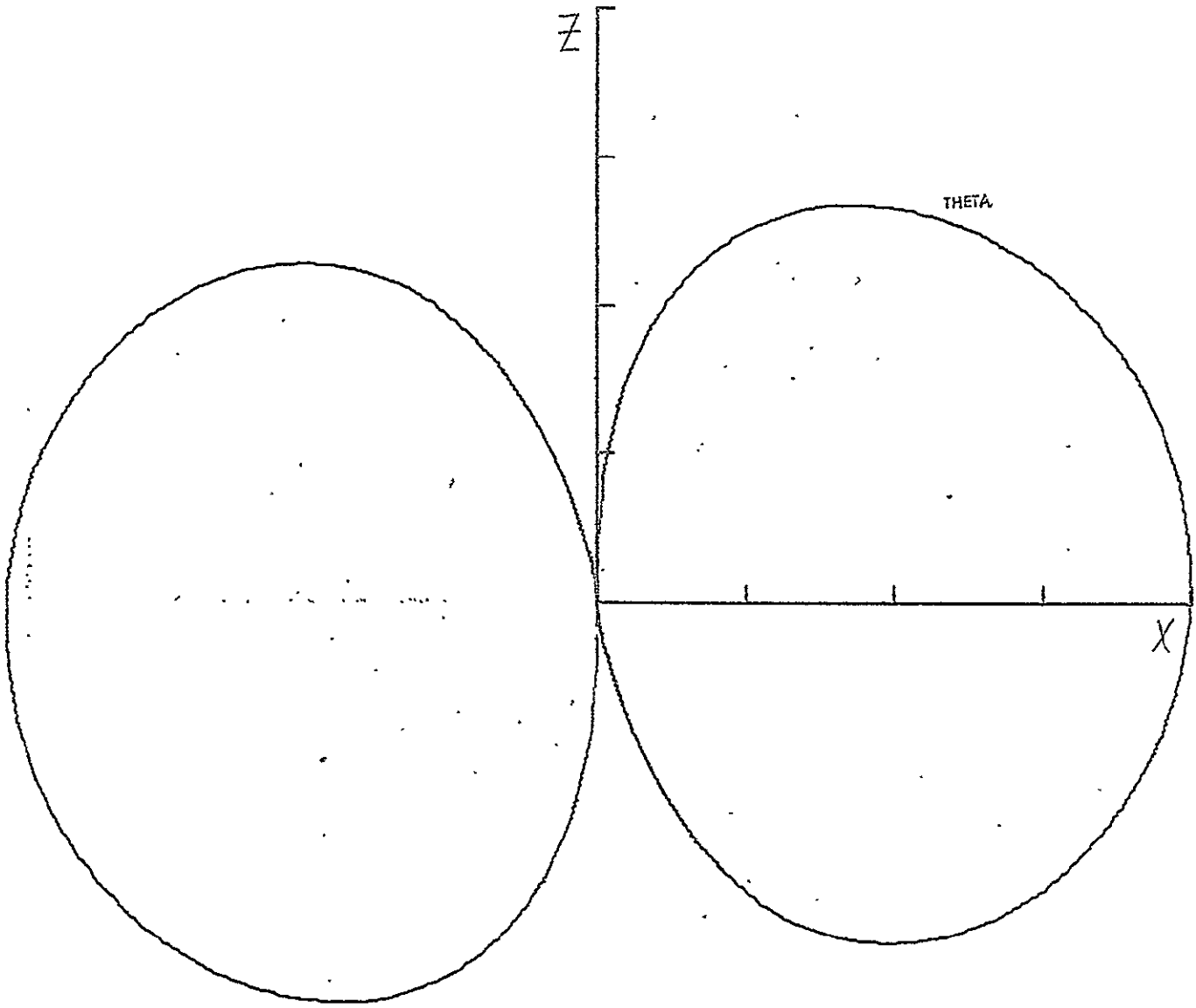

FIGURE B-120

FREQUENCY (MHZ) .540
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX - 4.3
DB MIN -24.3

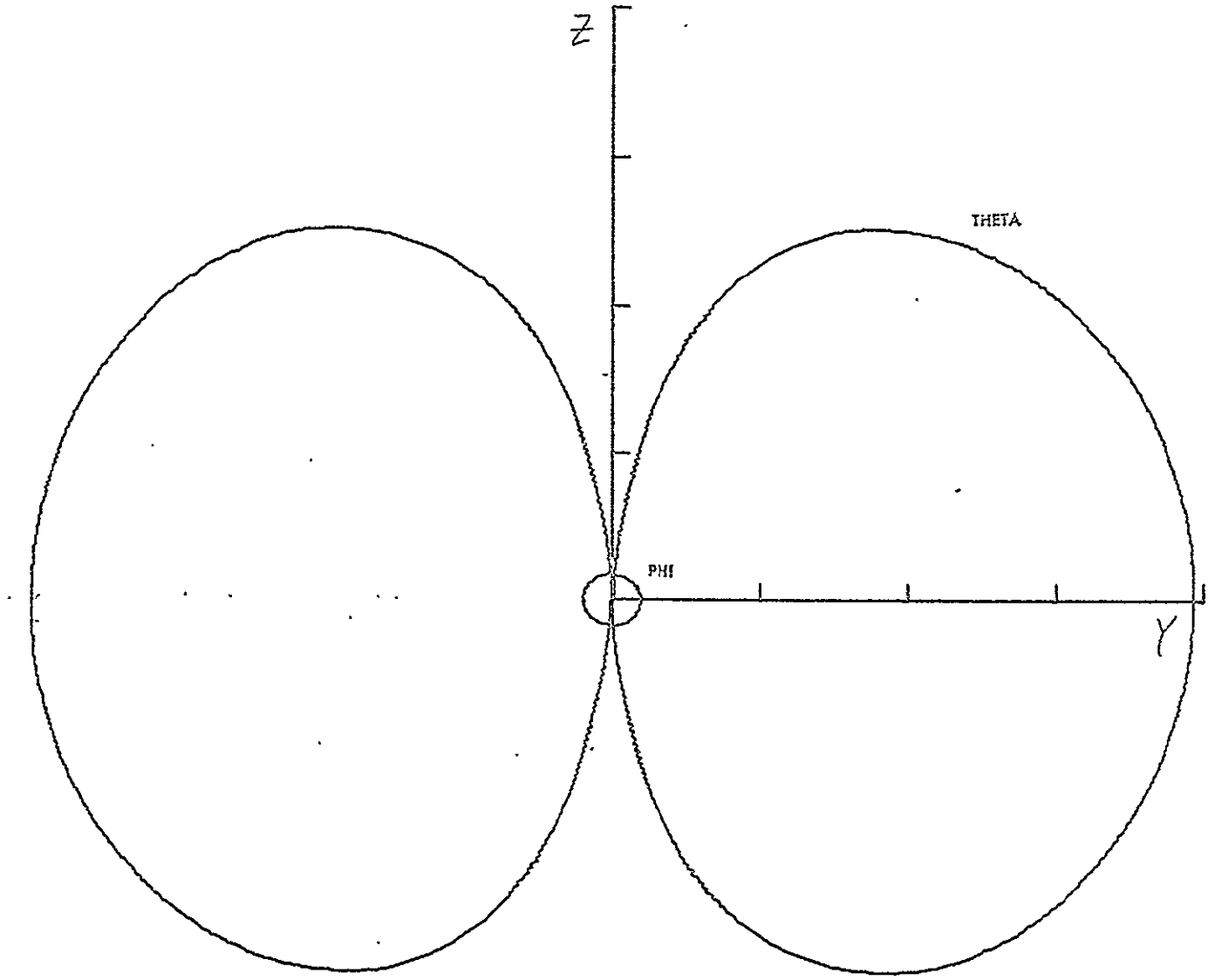

FIGURE B-121

FREQUENCY (MHZ) .540
V-ANT. LENGTH (FT) .450
MODE BALANCED
DB MAX -4.3
DB MIN -24.3

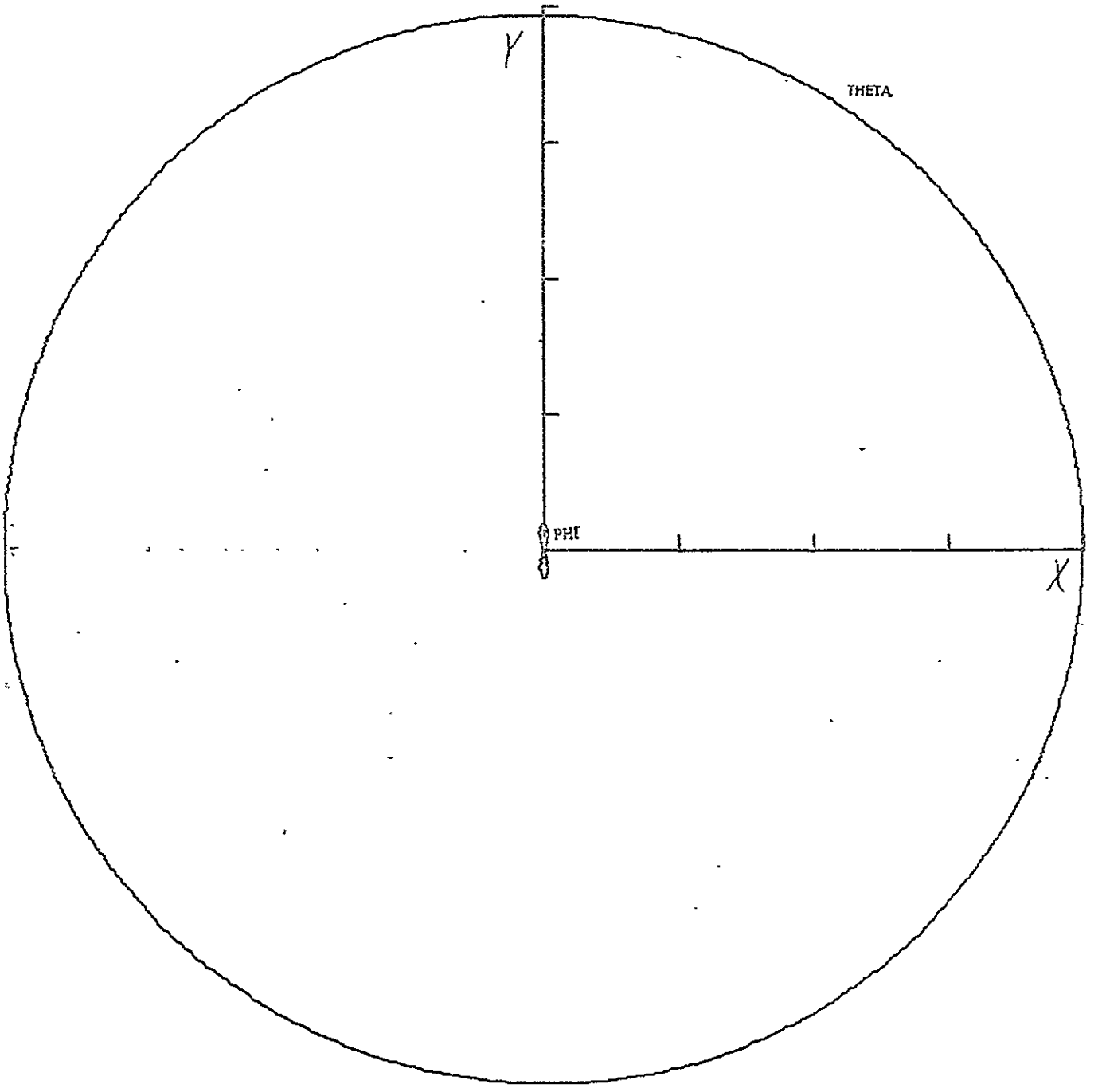

FIGURE B-122

FREQUENCY (MHZ) .540
V-ANT. LENGTH (FT) 450
MODE. BALANCED
DB MAX — 4.3
DB MIN — 24.3

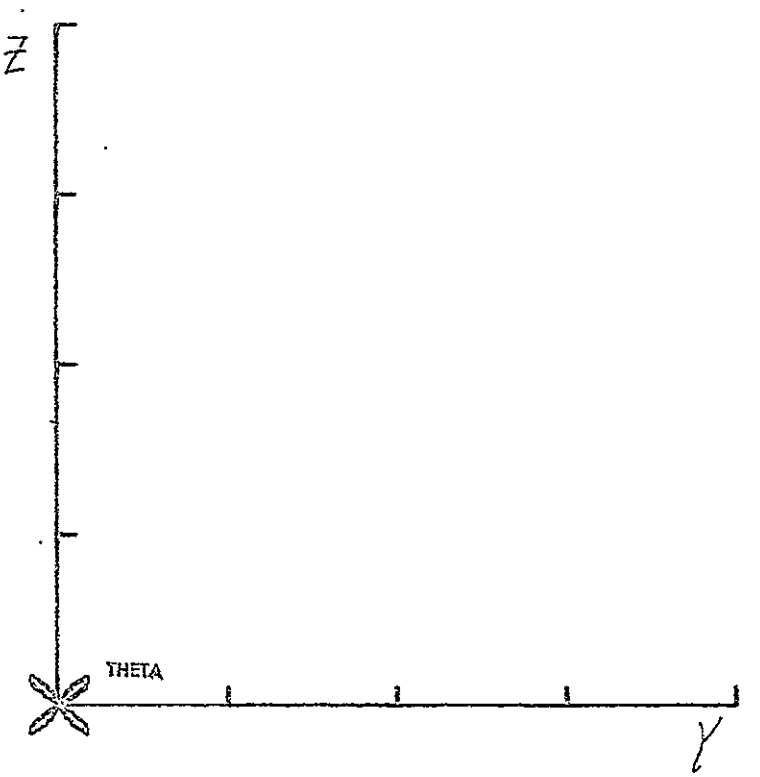

FIGURE B-123

FREQUENCY (MHZ) .540
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX - 4.3
DB MIN -24.3

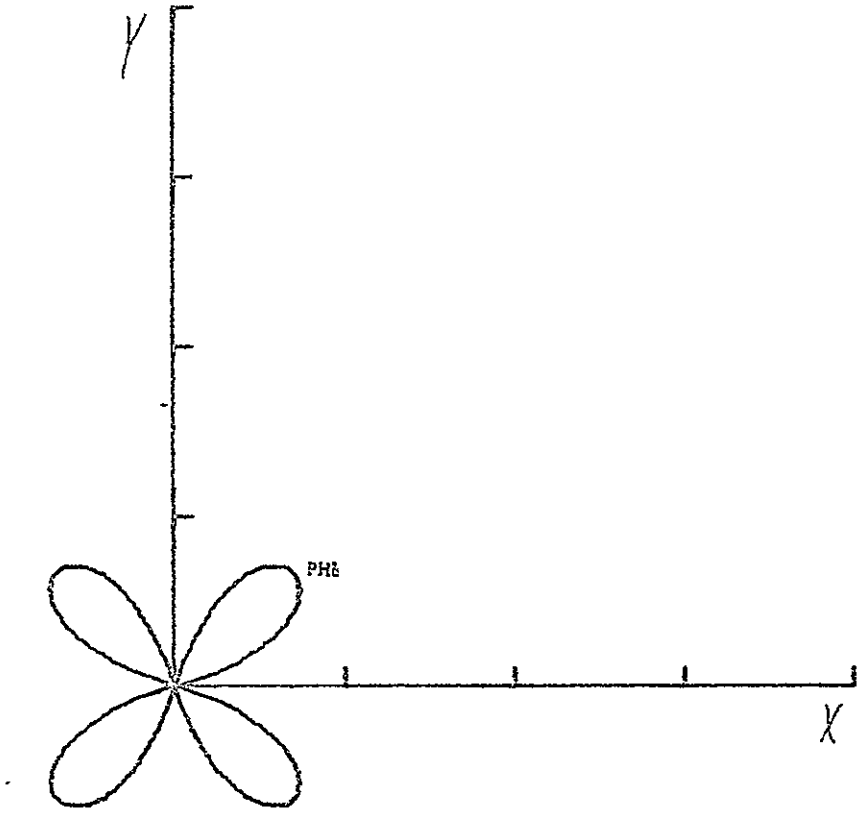

FIGURE B-124

FREQUENCY (MHZ) .540
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX — 4.3
DB MIN —24.3

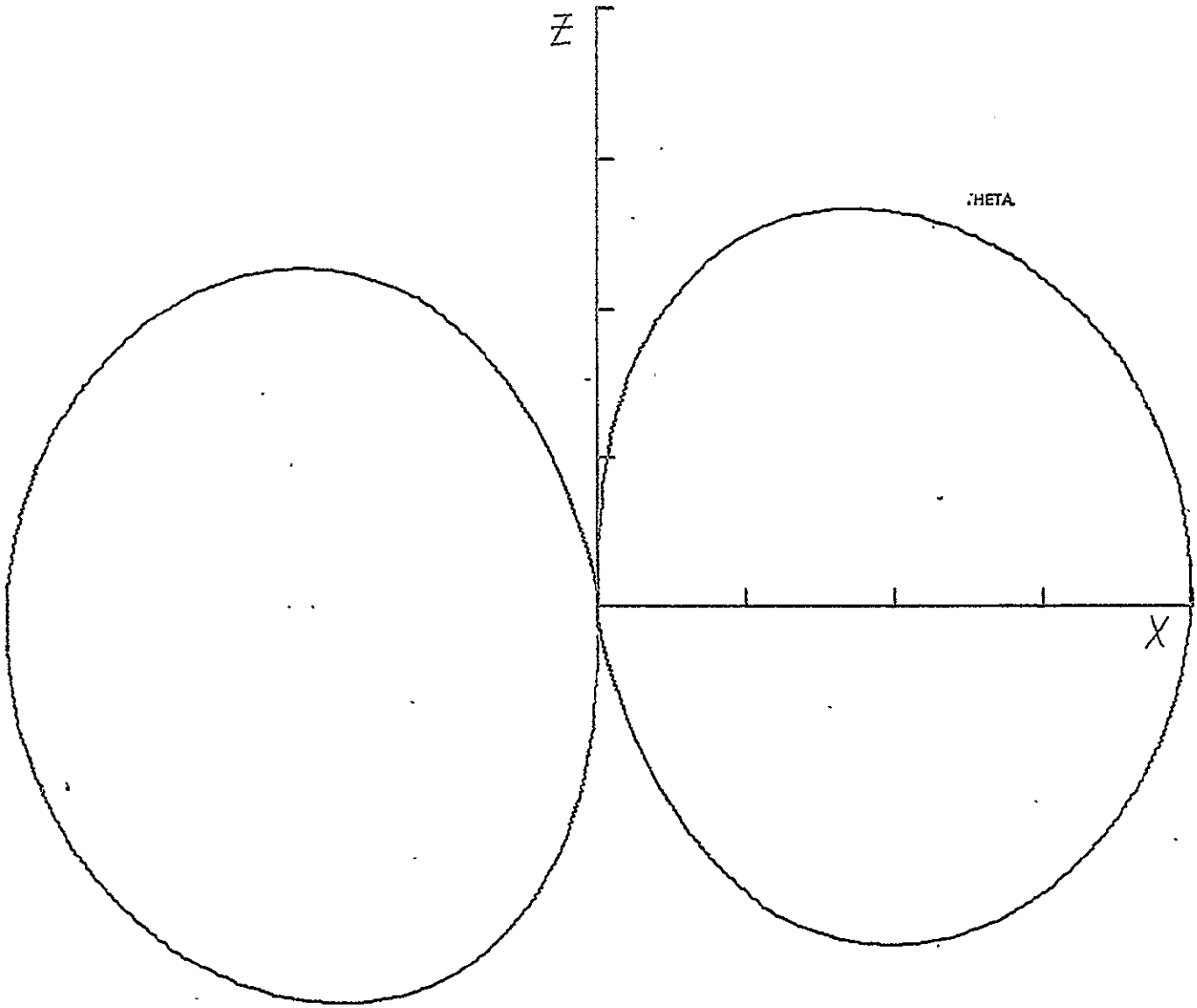

FIGURE B-125

FREQUENCY (MHZ) .700
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX – 1.5
DB MIN – 21.5

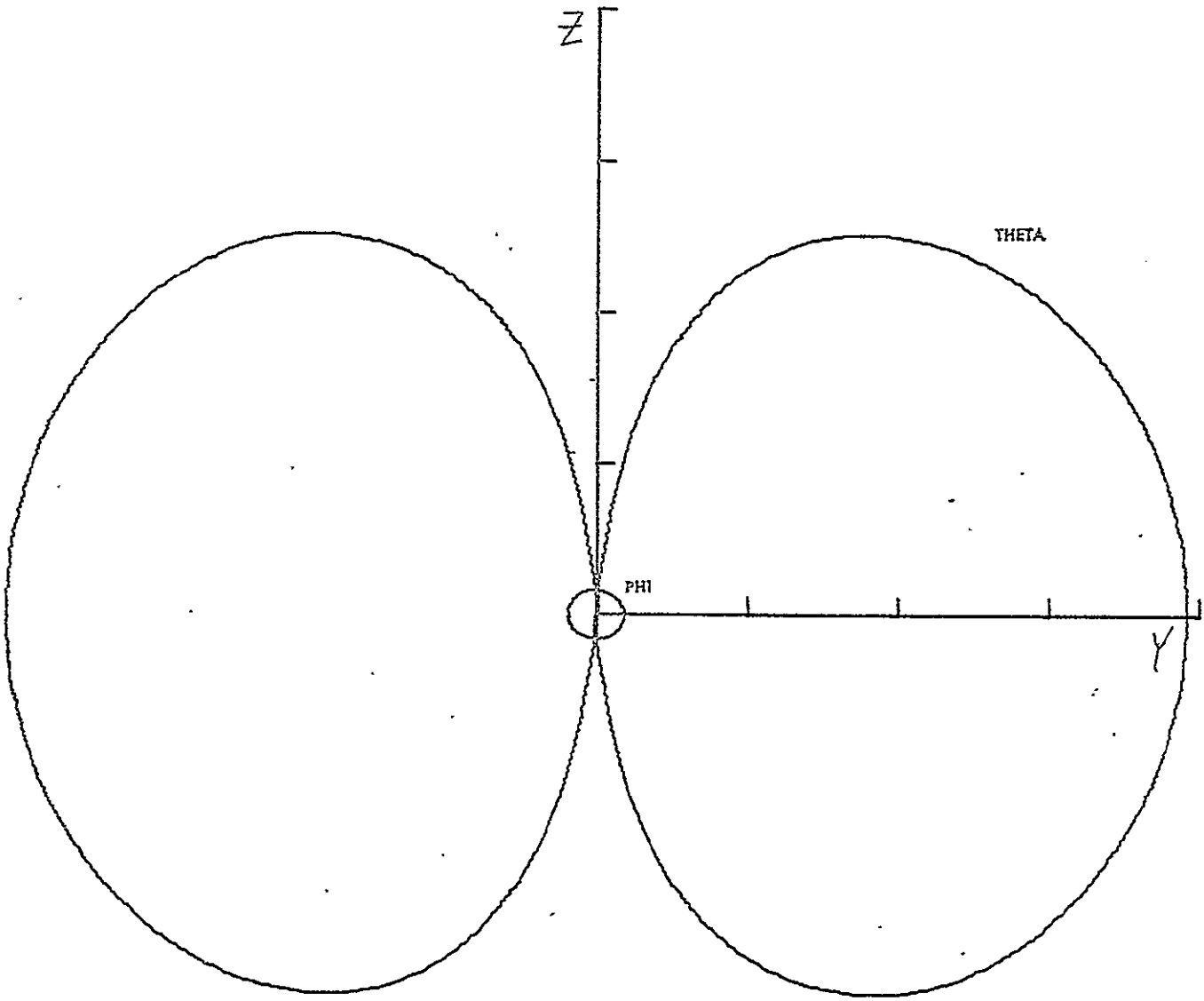

FIGURE B-126

FREQUENCY (MHZ) .700
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX - 1.5
DB MIN - 21.5

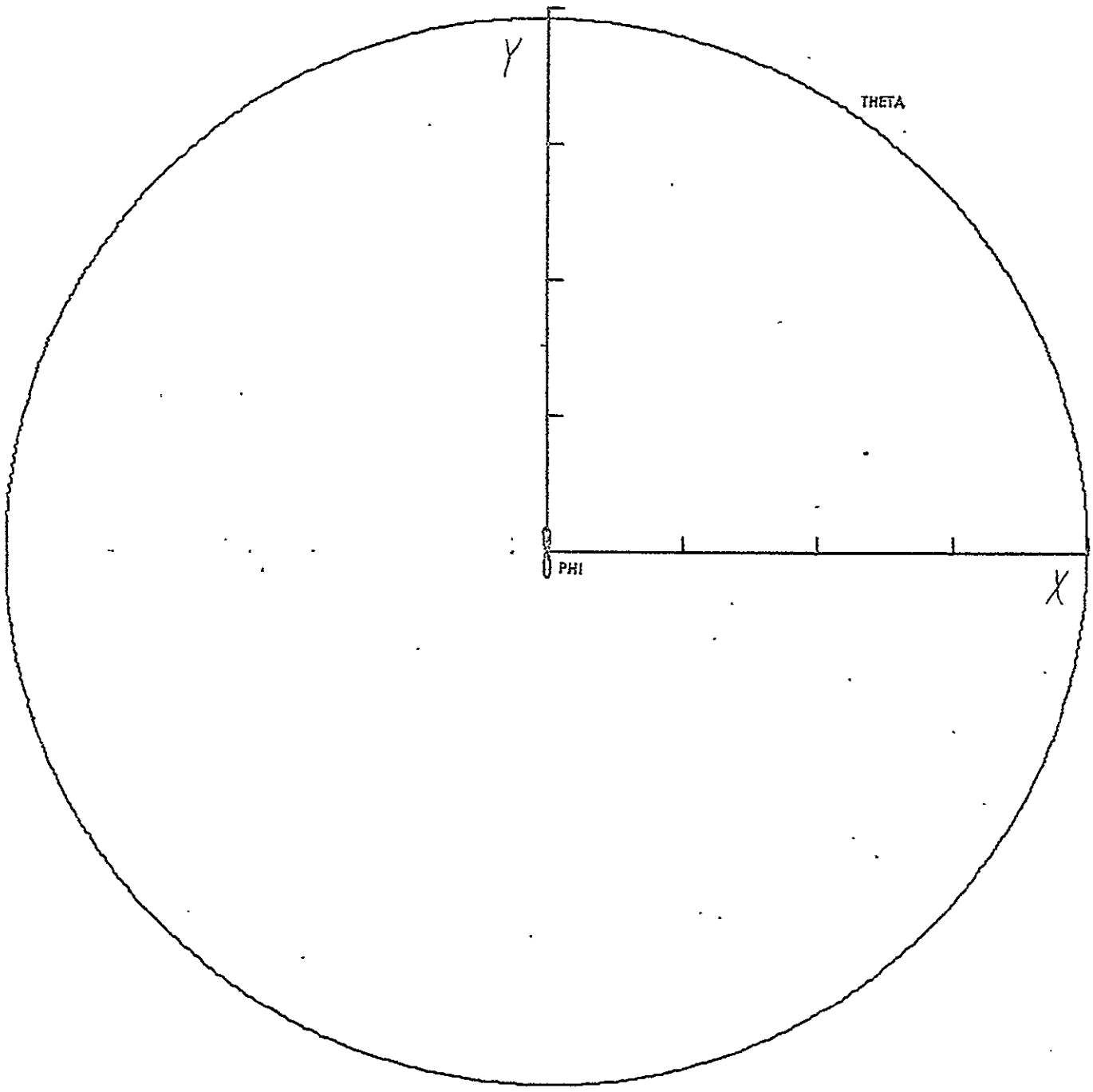

FIGURE B-127

FREQUENCY (MHZ) .700
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX — 1.5
DB MIN — 21.5

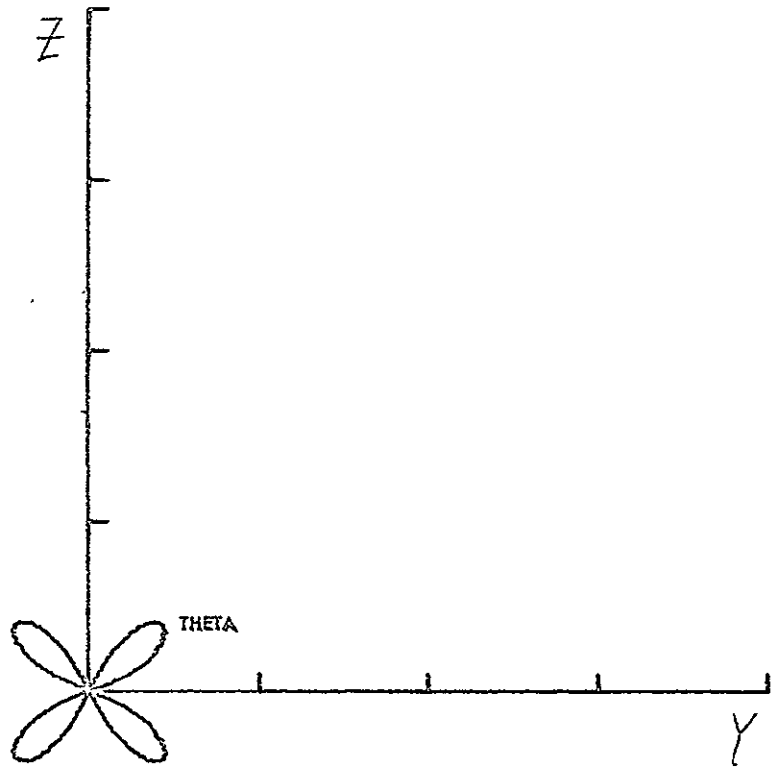

FIGURE B-128

FREQUENCY (MHZ) .700
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX — 1.5
DB MIN —21.5

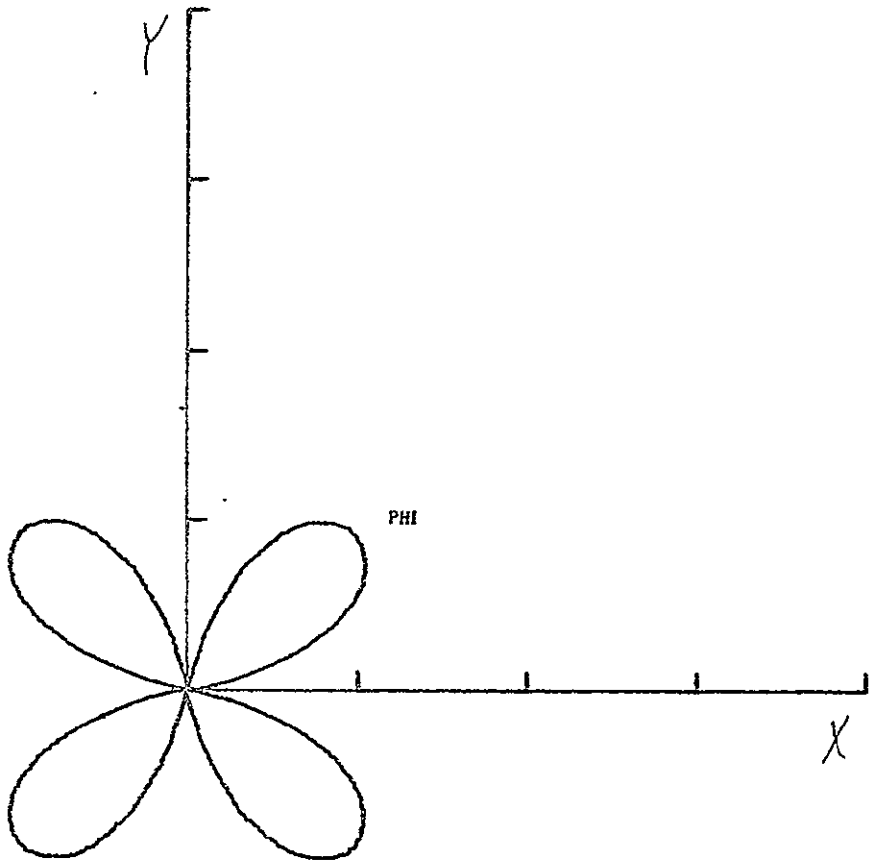

FIGURE B-129

FREQUENCY (MHZ) .700
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX — 1.5
DB MIN — 21.5

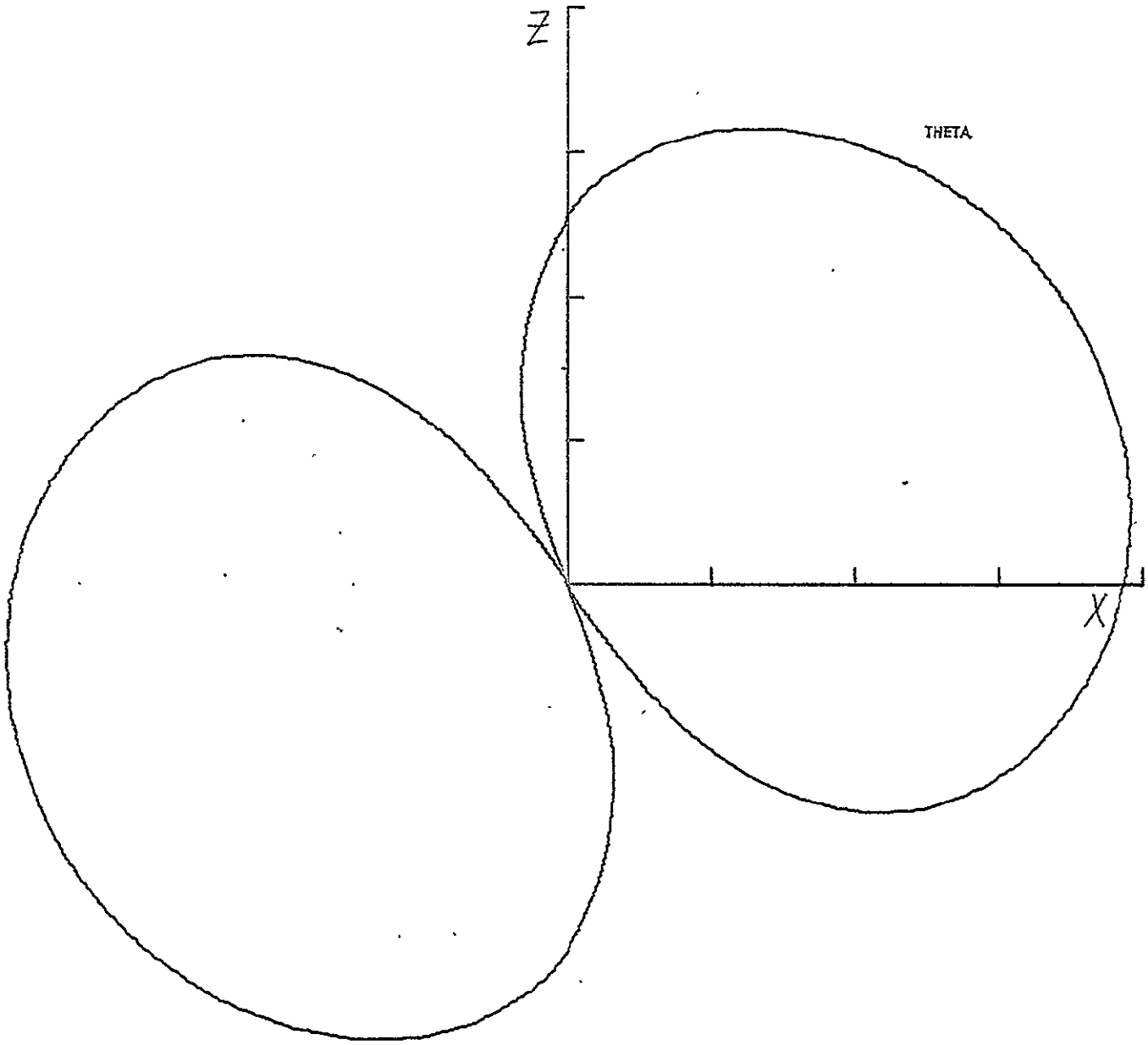

FIGURE B-130

FREQUENCY (MHZ) .900
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX — 1.1
DB MIN — 21.1

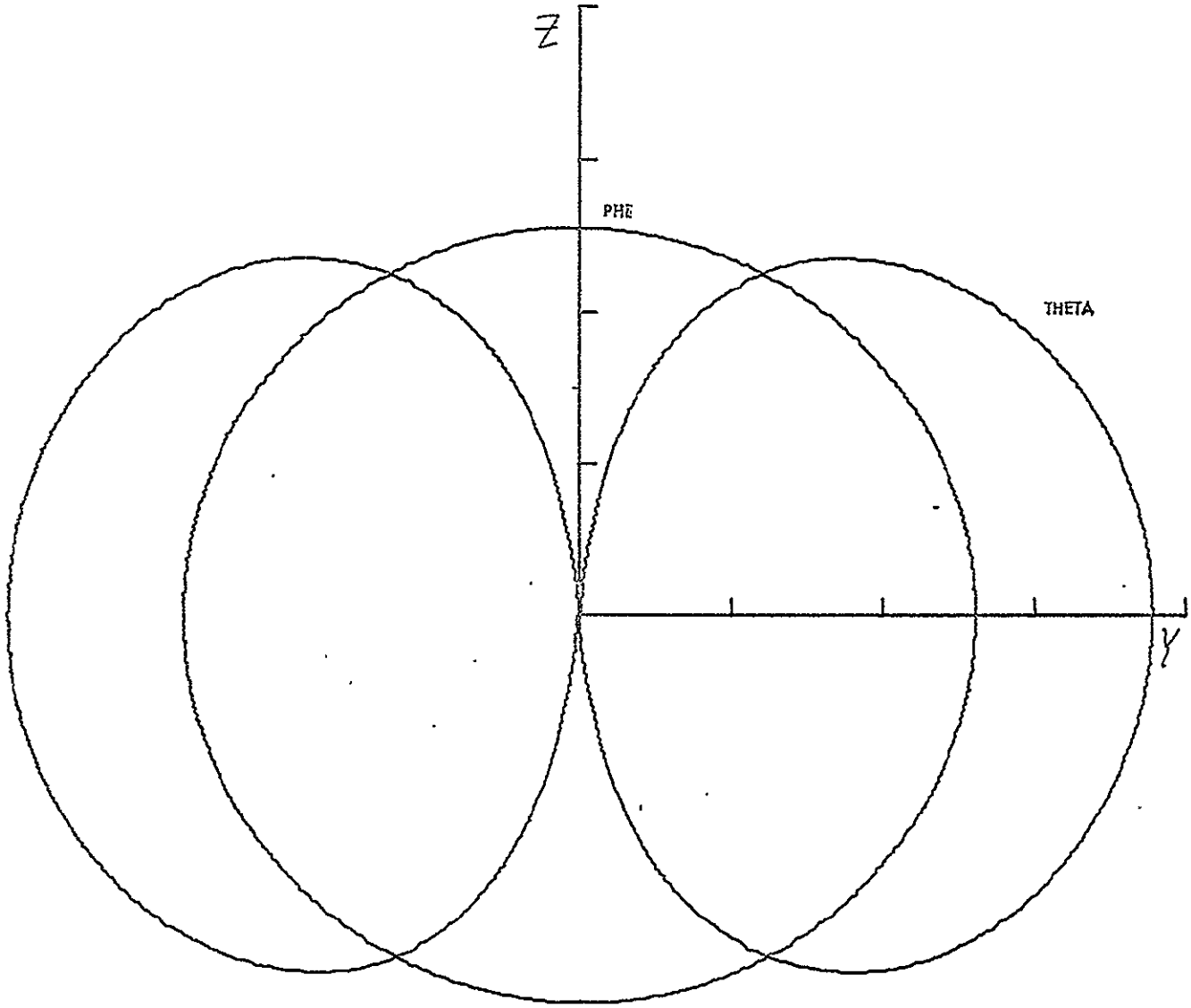

FIGURE B-131

FREQUENCY (MHZ) .900
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX – 1.1
DB MIN – 21.1

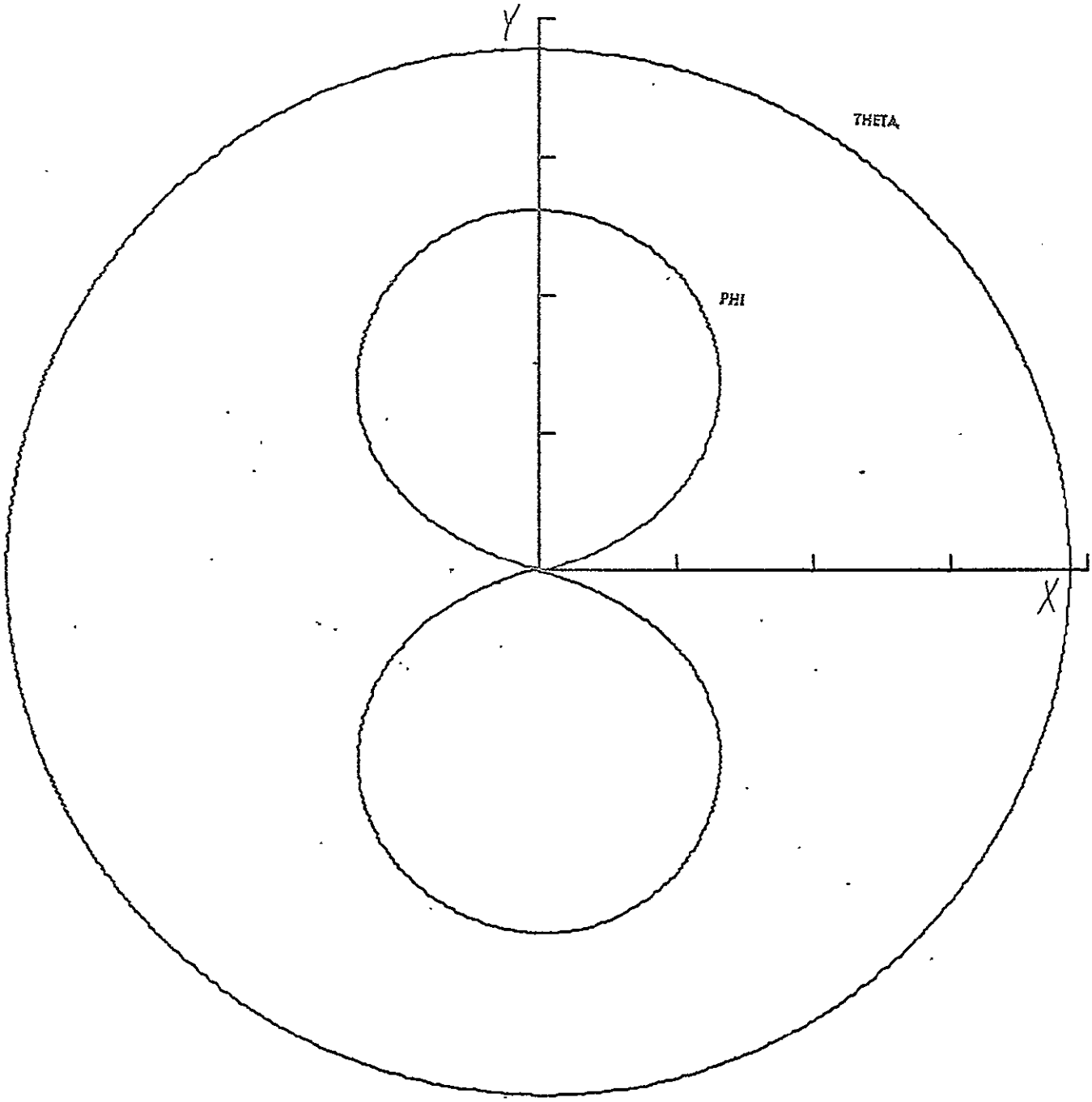

FIGURE B-132.

FREQUENCY (MHZ) .900
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX — 1.1
DB MIN — 21.1

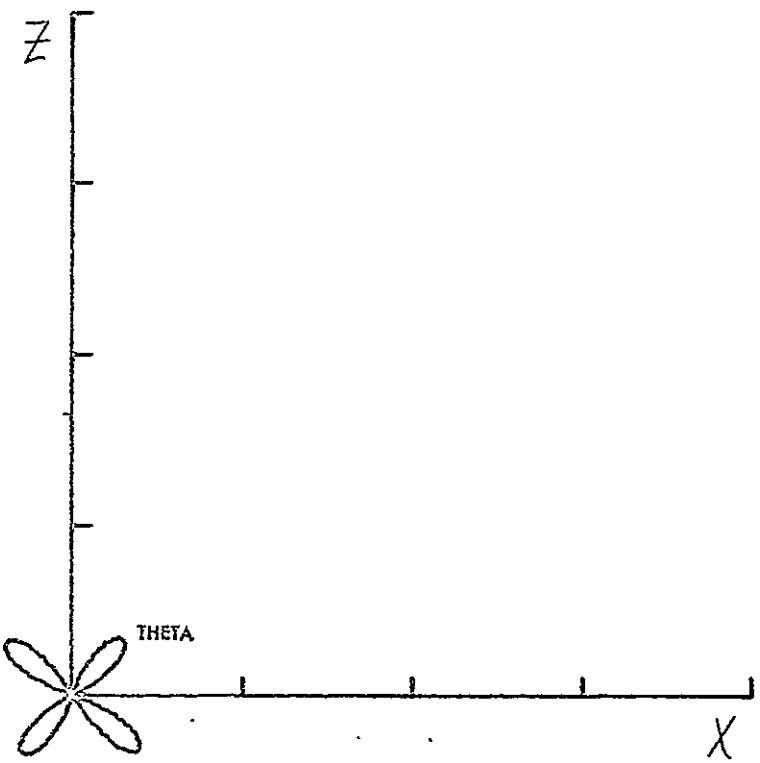

FIGURE B - 133

FREQUENCY (MHZ) .900
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX — 1.1
DB MIN —21.1

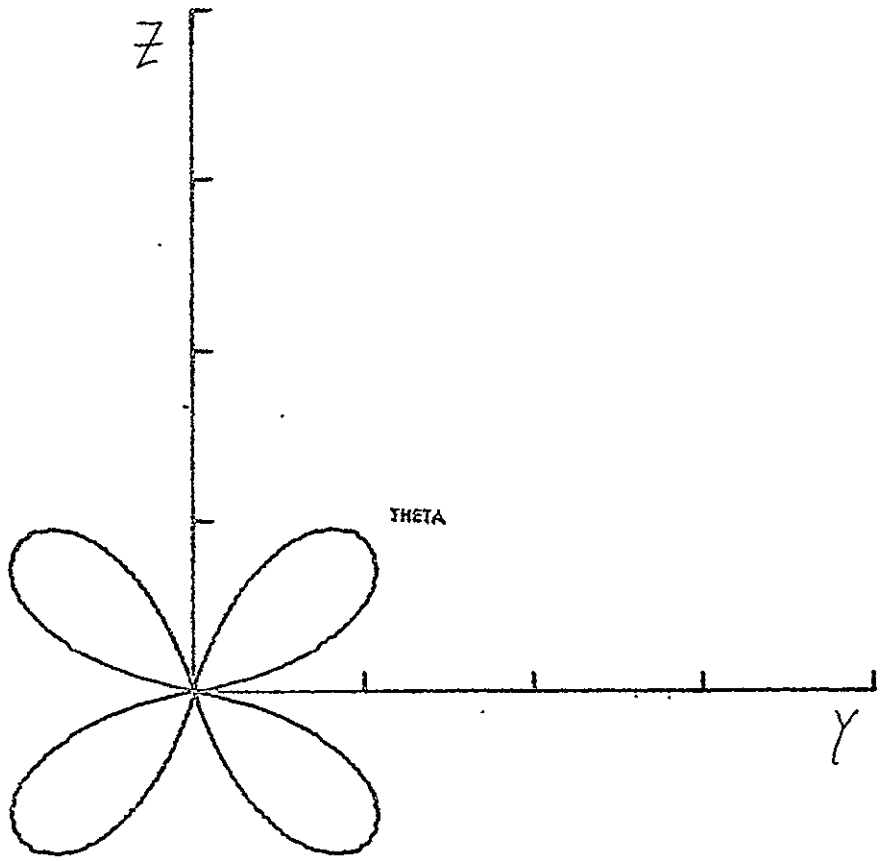

FIGURE B-134

FREQUENCY (MHZ) .900
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX — 1.1
DB MIN —21.1

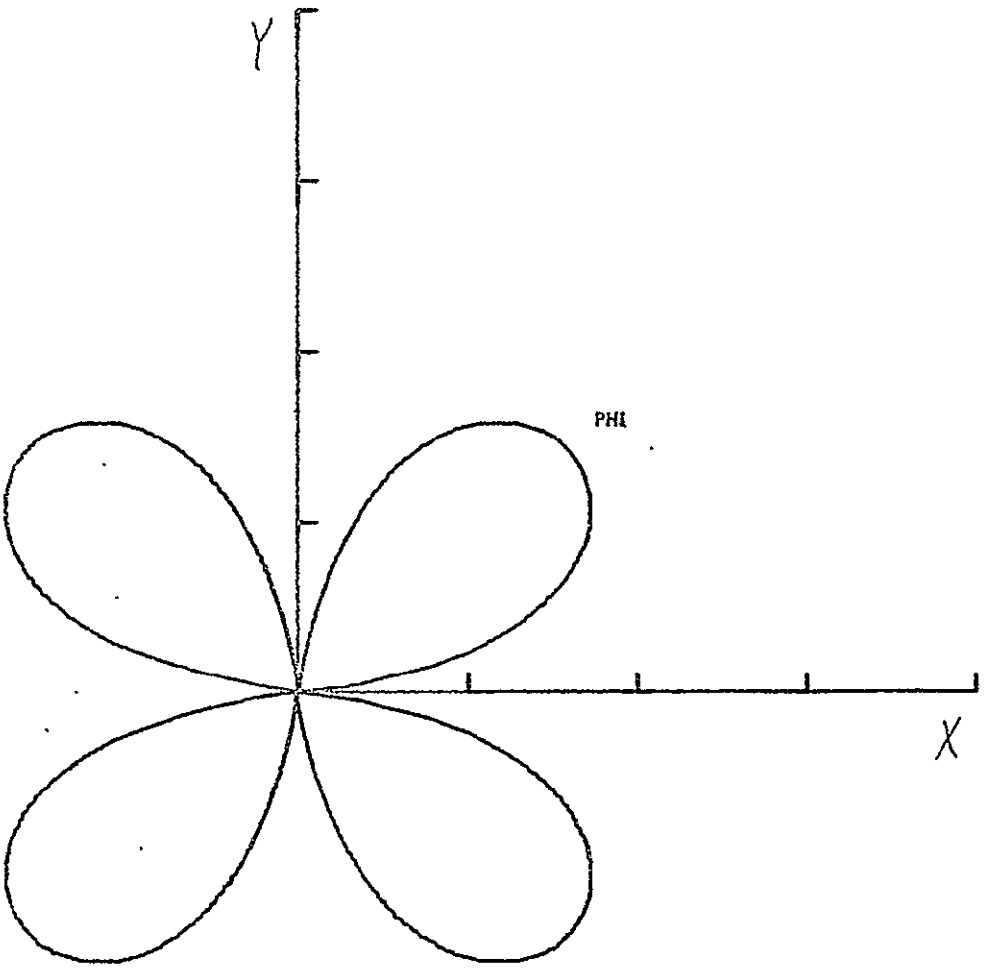

FIGURE B-135

FREQUENCY (MHZ) .900
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX - 1.1
DB MIN - 21.1

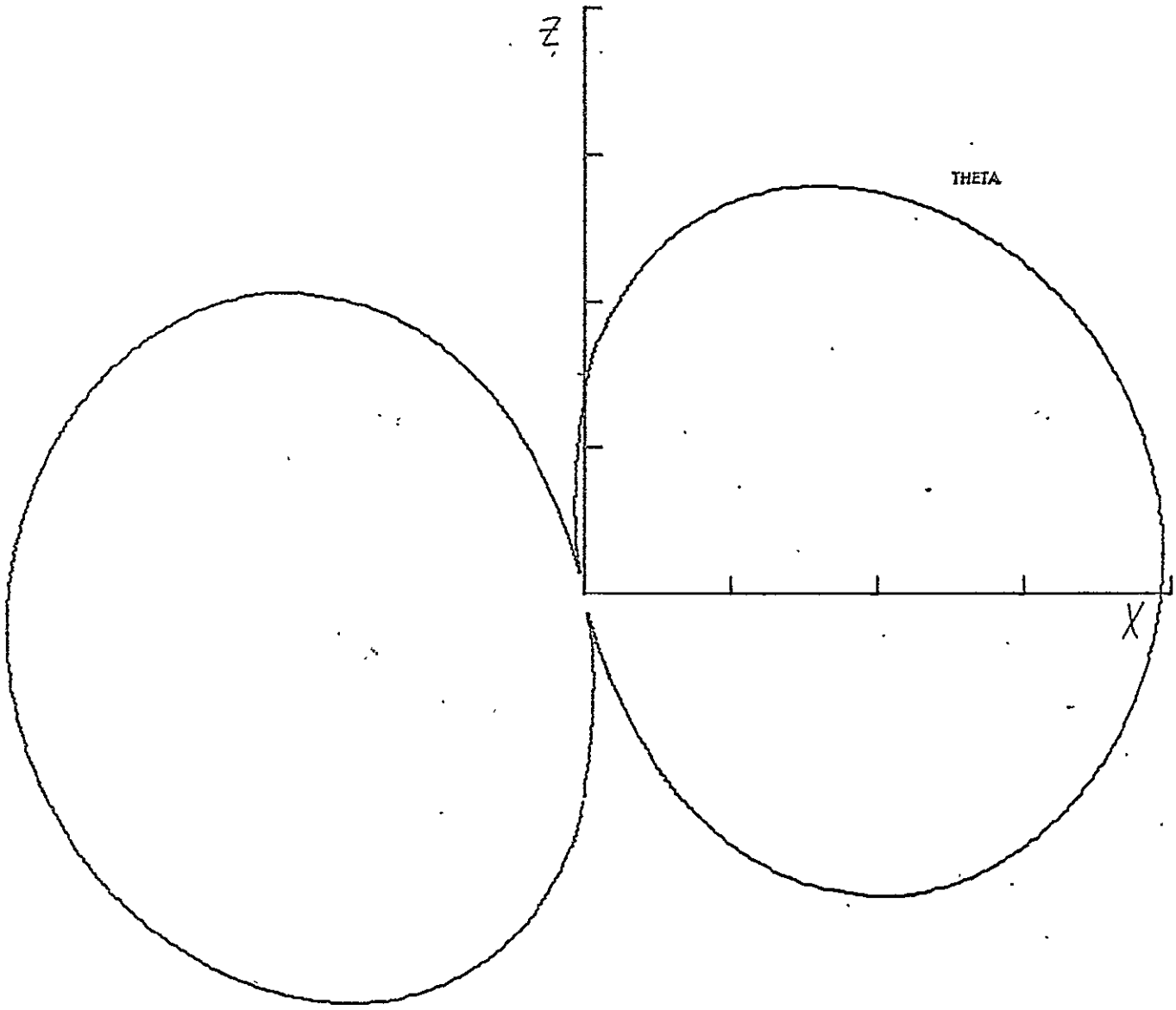

FIGURE B-136

FREQUENCY (MHZ) .995
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX -0.8
DB MIN -20.8

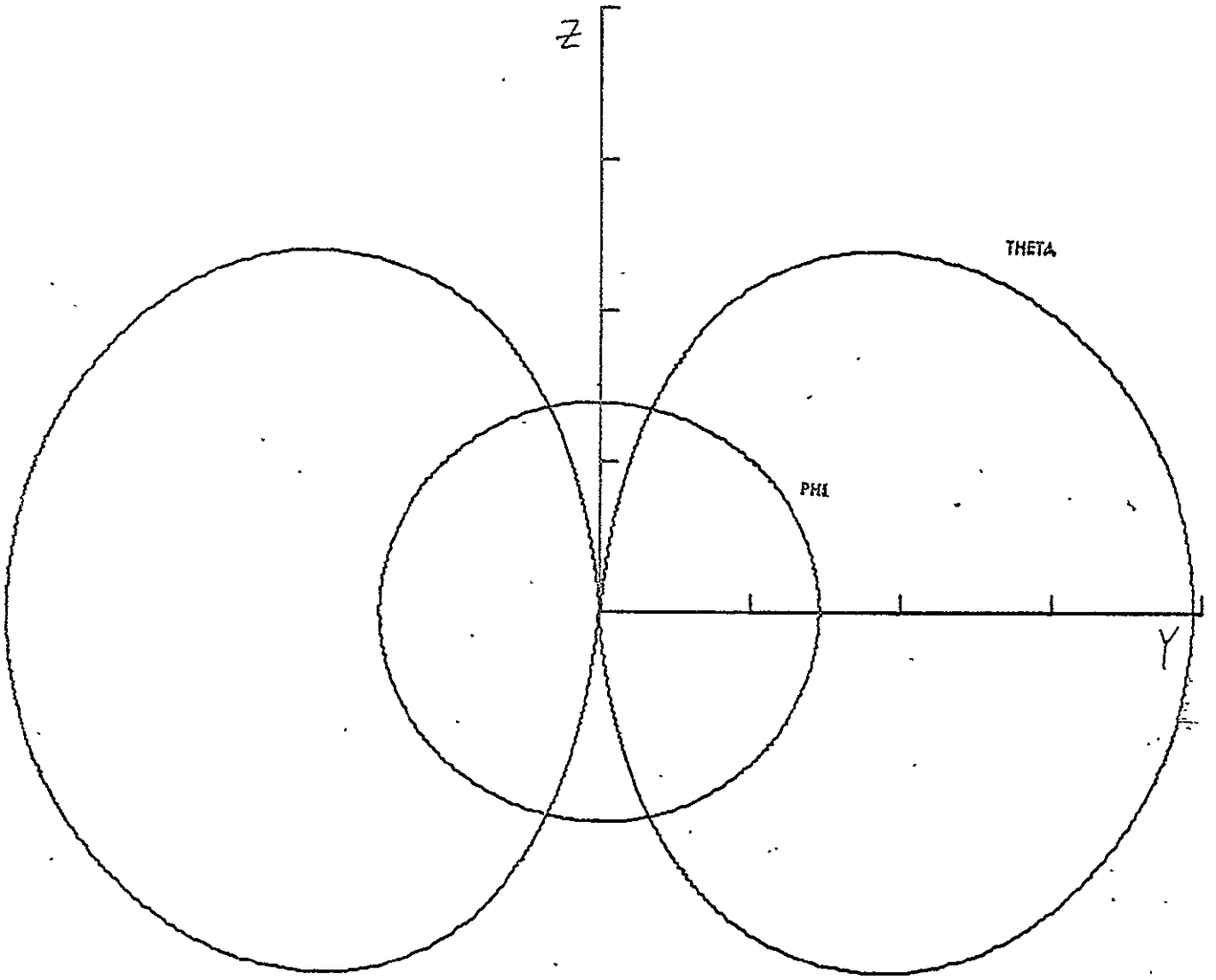

FIGURE B-137

FREQUENCY (MHZ) .995
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX -10.8
DB MIN -20.8

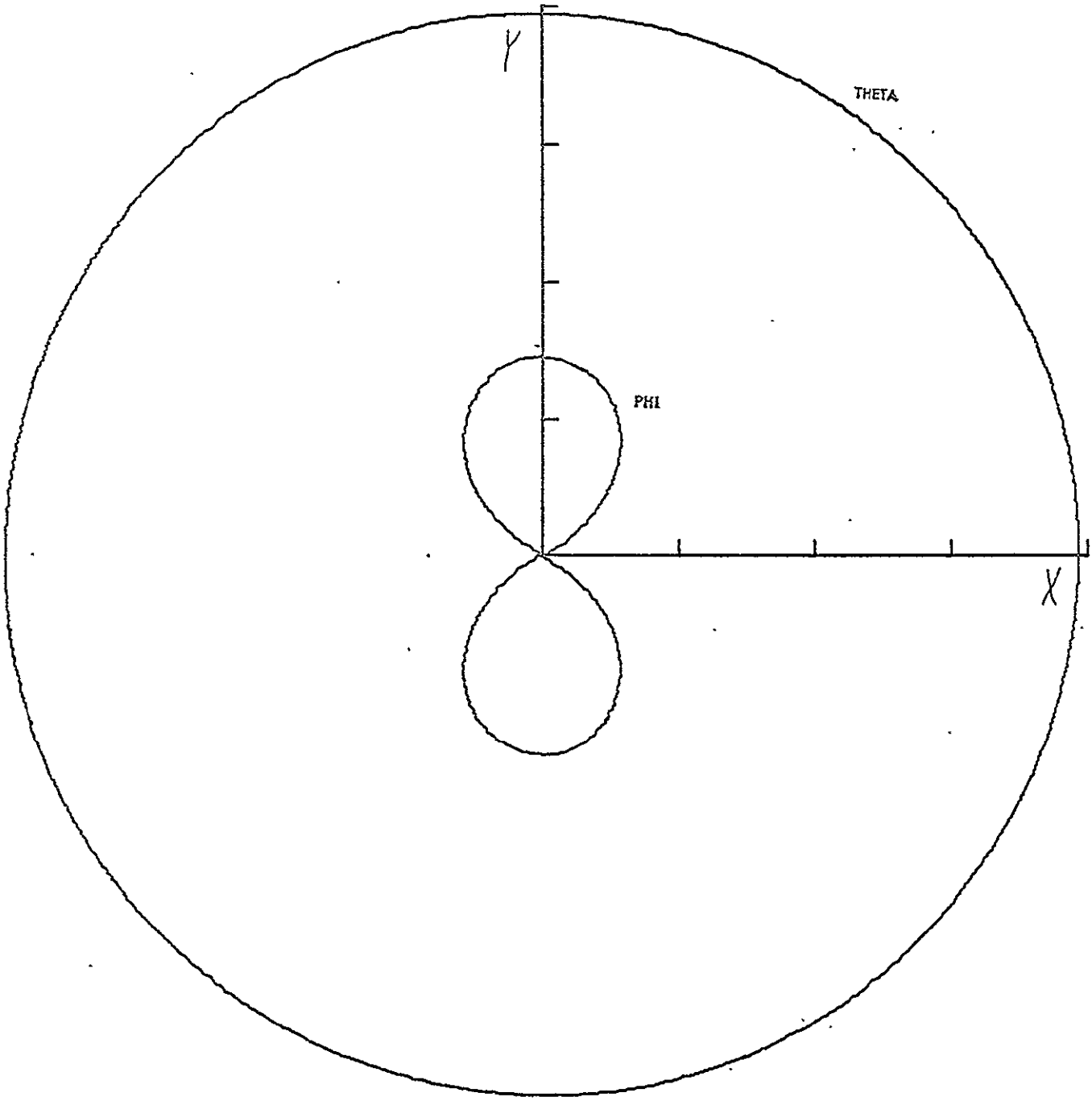

FIGURE B-138

FREQUENCY (MHZ) .995
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX - 0.8
DB MIN -20.8

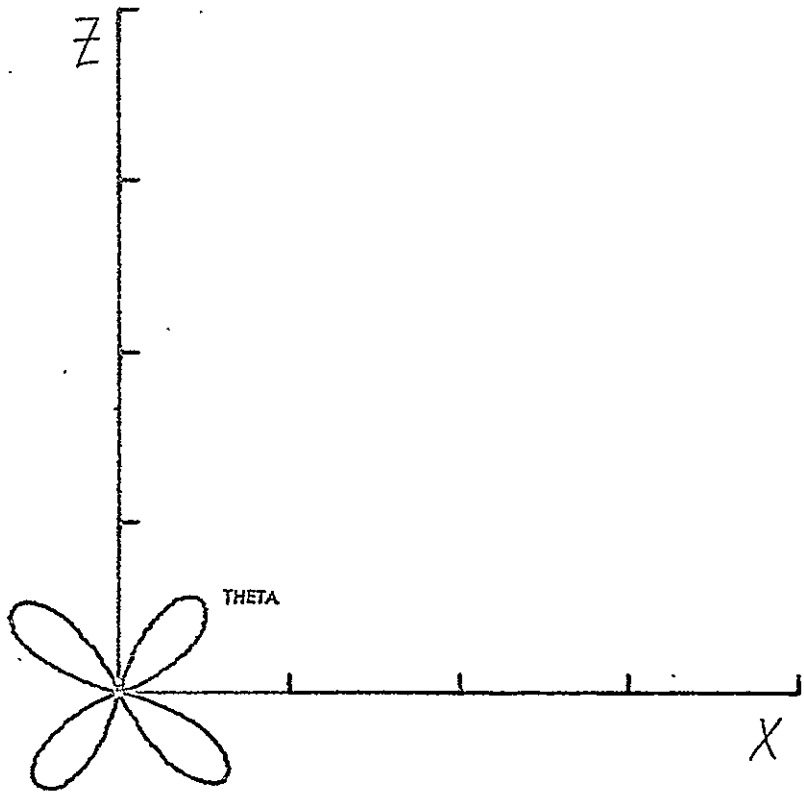

FIGURE B-139

FREQUENCY (MHZ) .995
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX - 0.8
DB MIN -20.8

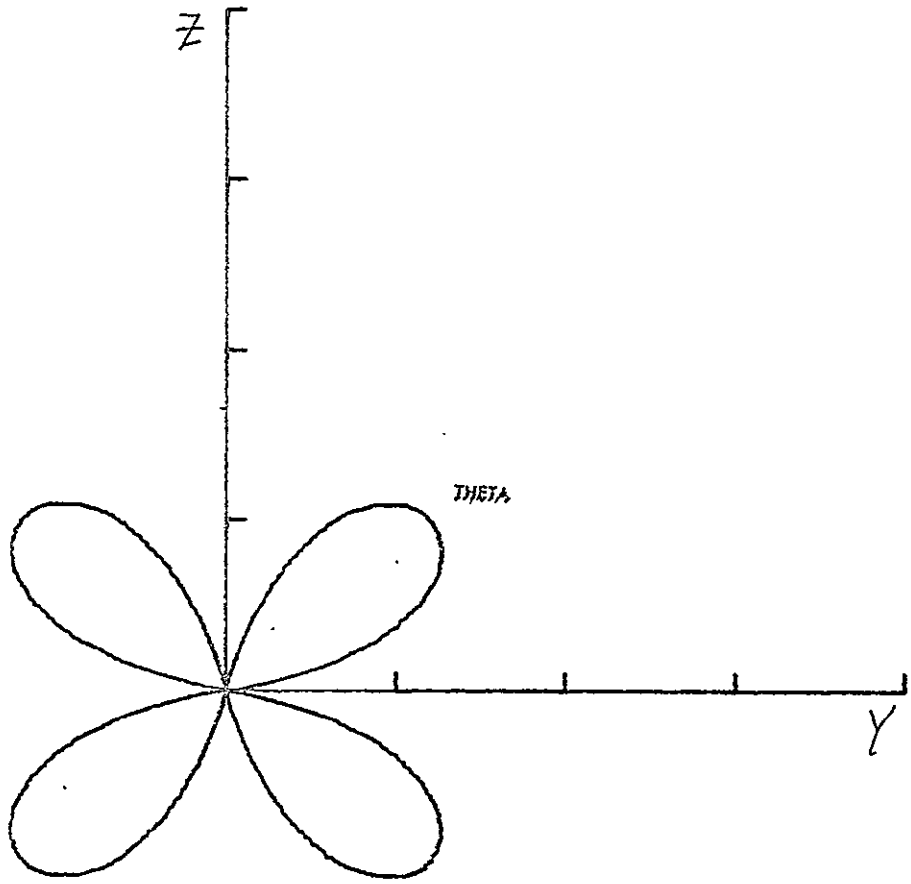

FIGURE B-140

FREQUENCY (MHZ) .995
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX − 0.8
DB MIN − 20.8

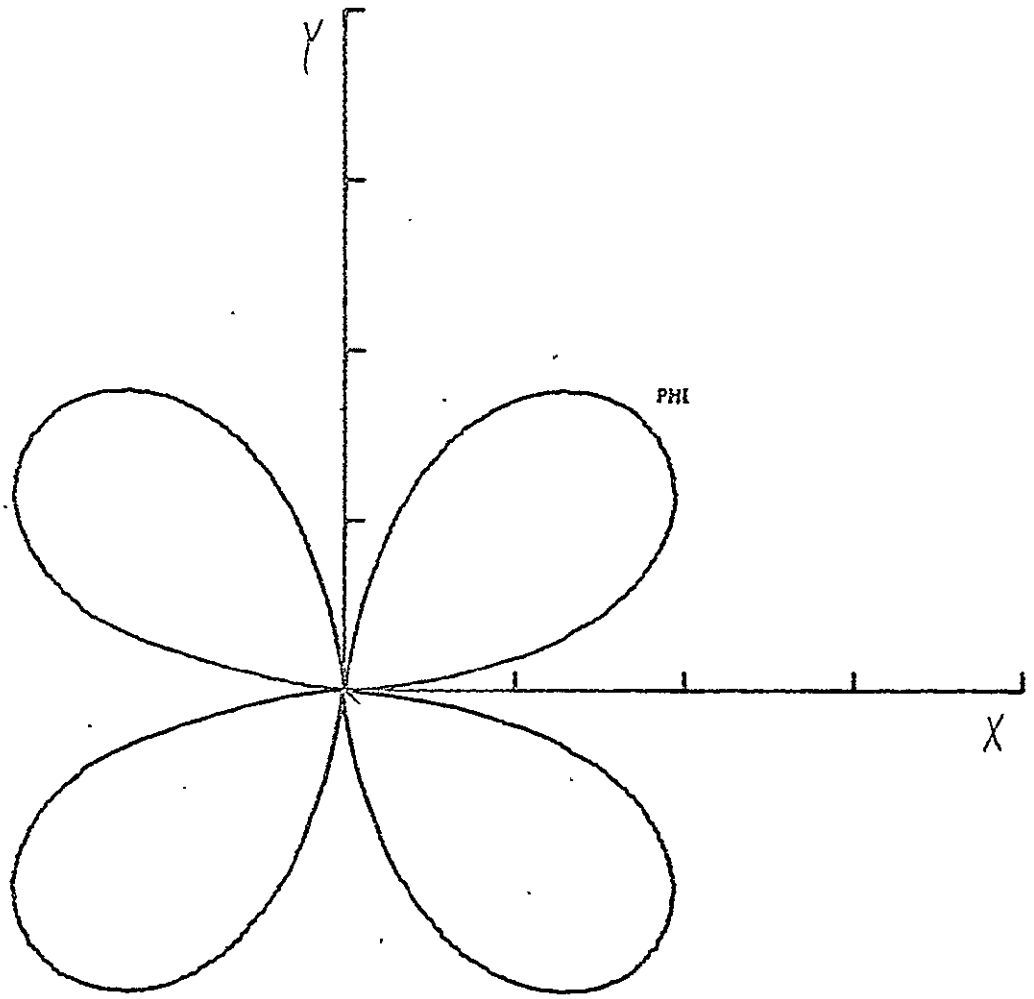

FIGURE B-141

FREQUENCY (MHZ) .995
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX -0.8
DB MIN -20.8

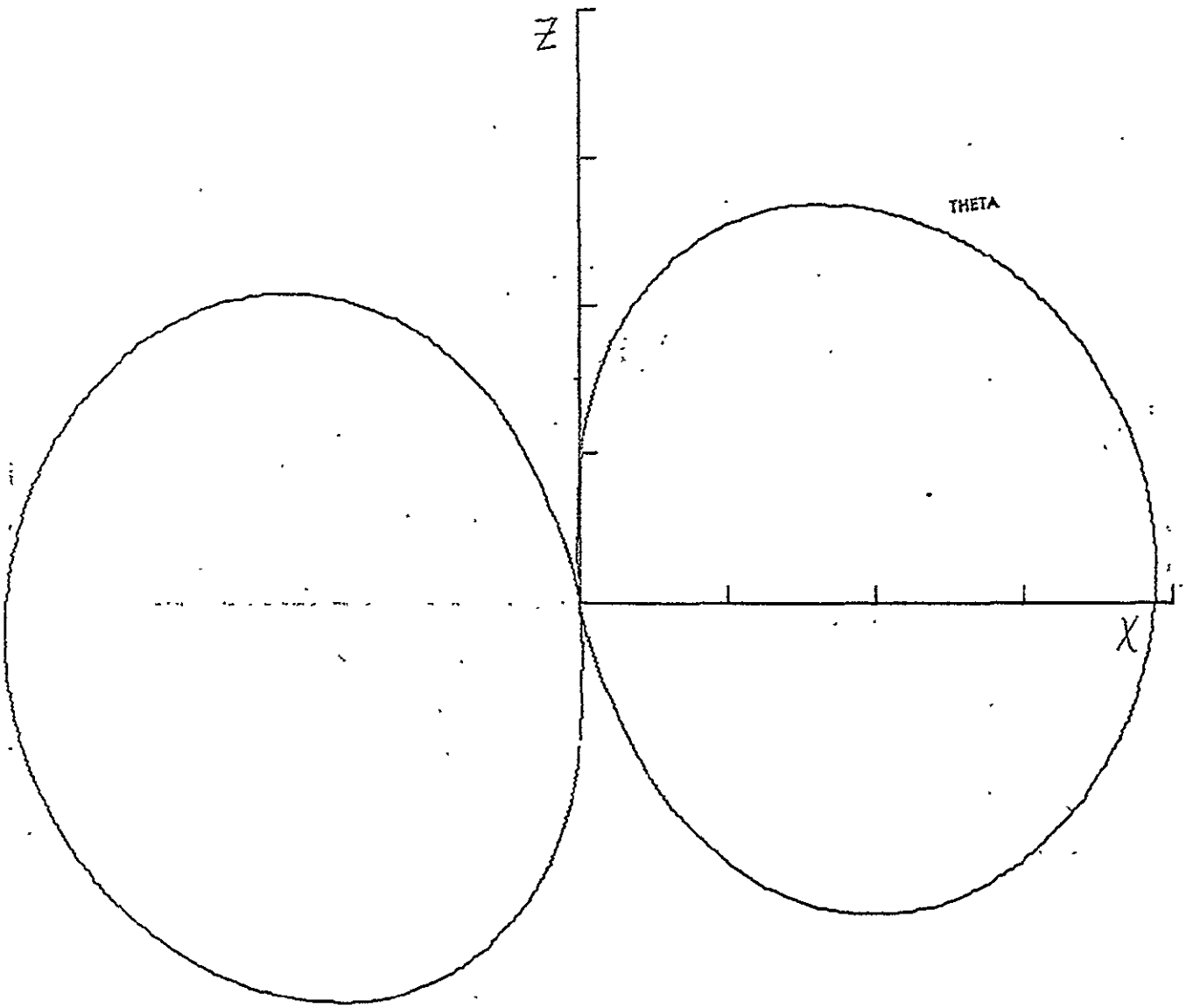

FIGURE B-142

FREQUENCY (MHZ) 1.107
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX - 0.3
DB MIN -20.3

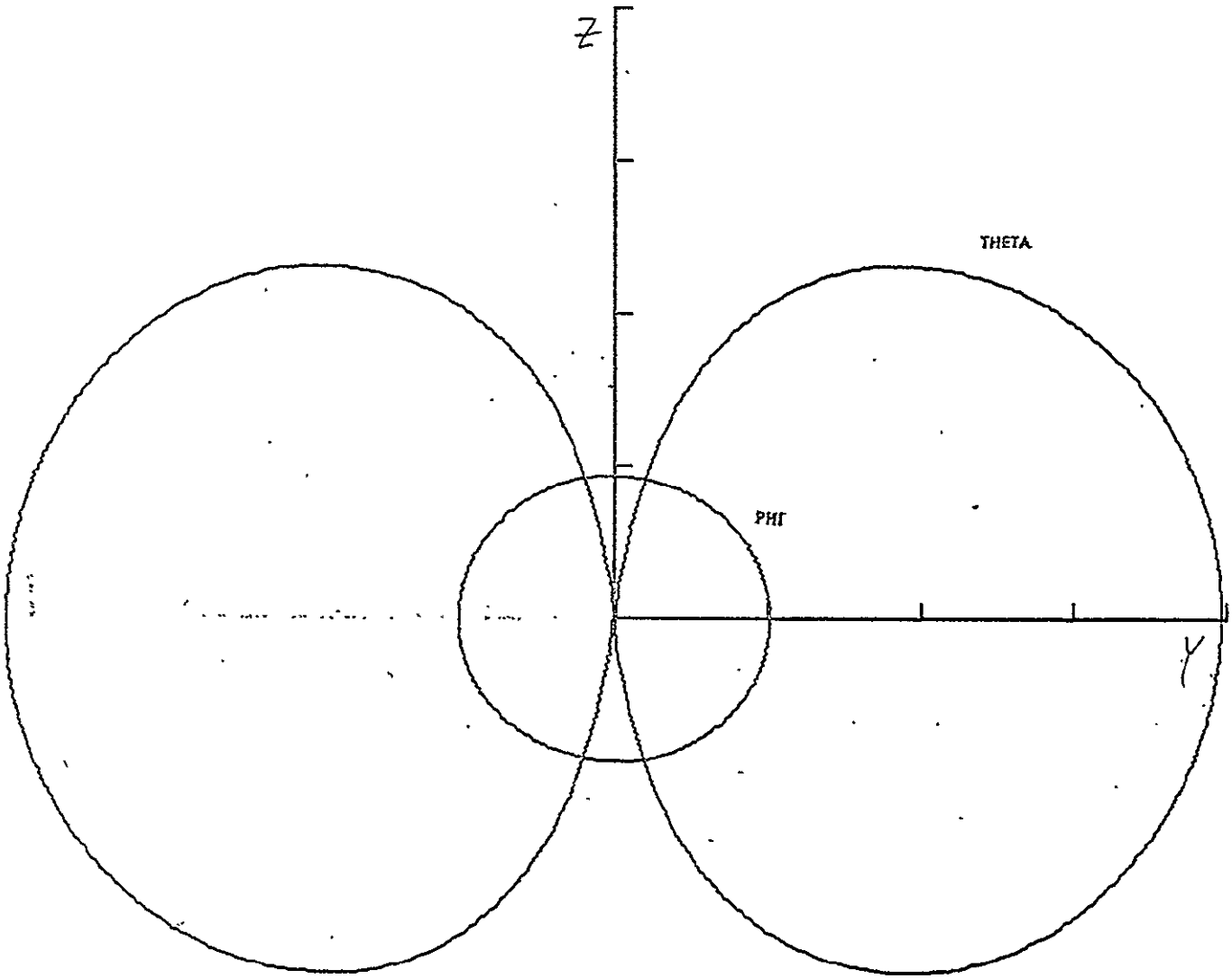

FIGURE B-143

FREQUENCY (MHZ) 1.107
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX — 0.3
DB MIN — 20.3

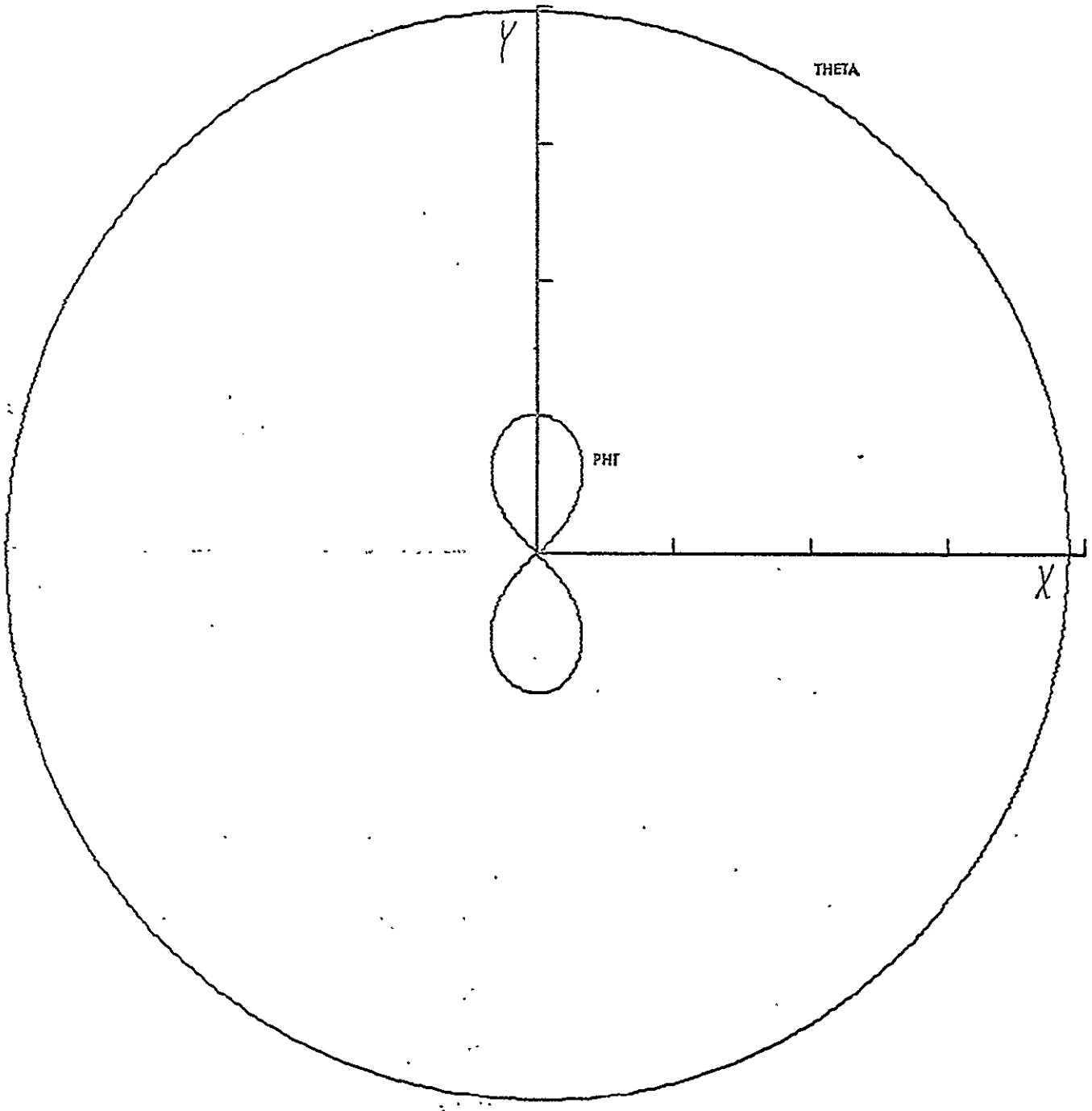

FIGURE B-144

FREQUENCY (MHZ) 1.107
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX — 0.3
DB MIN — 20.3

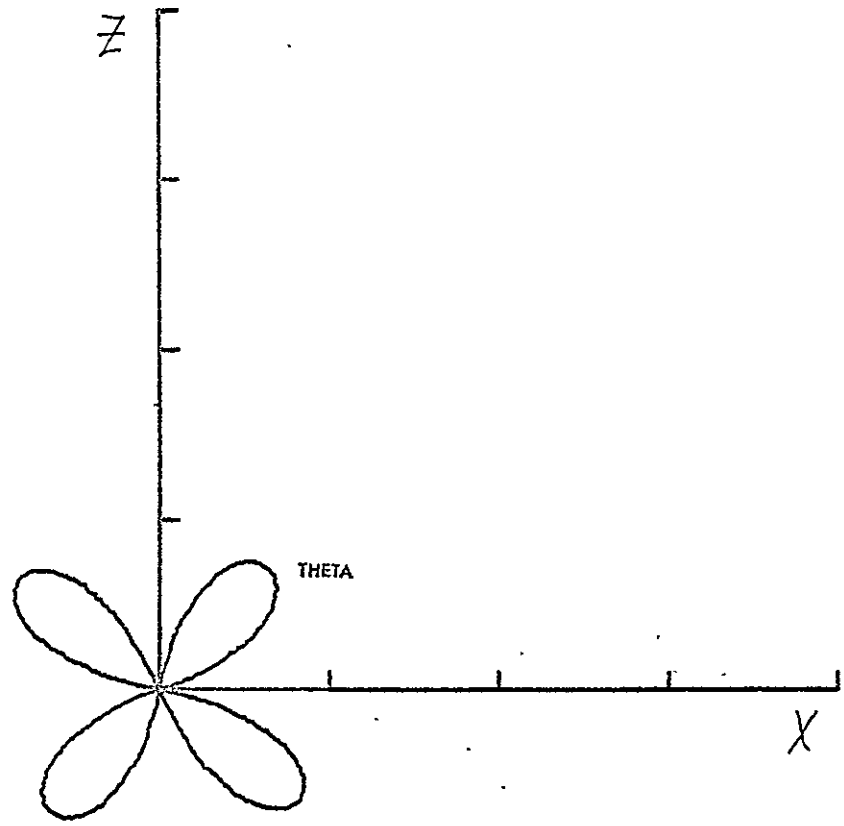

FIGURE B-145

FREQUENCY (MHZ) 1.107
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX - 0.3
DB MIN - 20.3

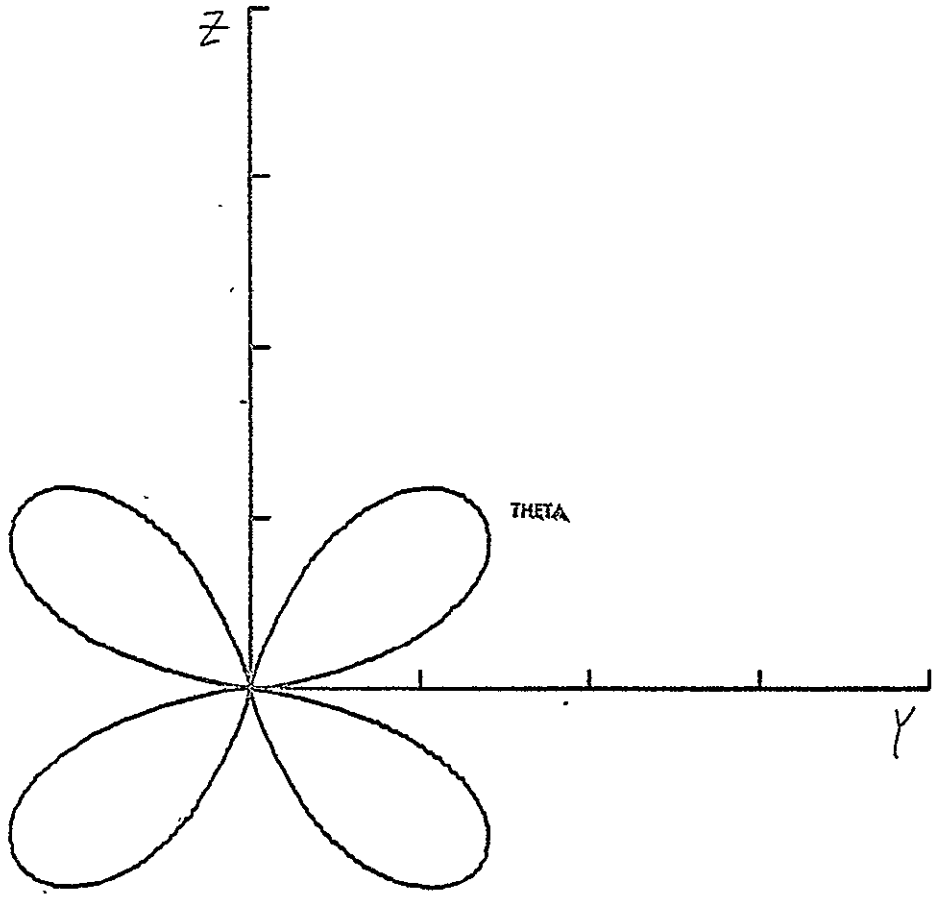

FIGURE B-146

FREQUENCY (MHZ) 1.107
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX - 0.3
DB MIN -20.3

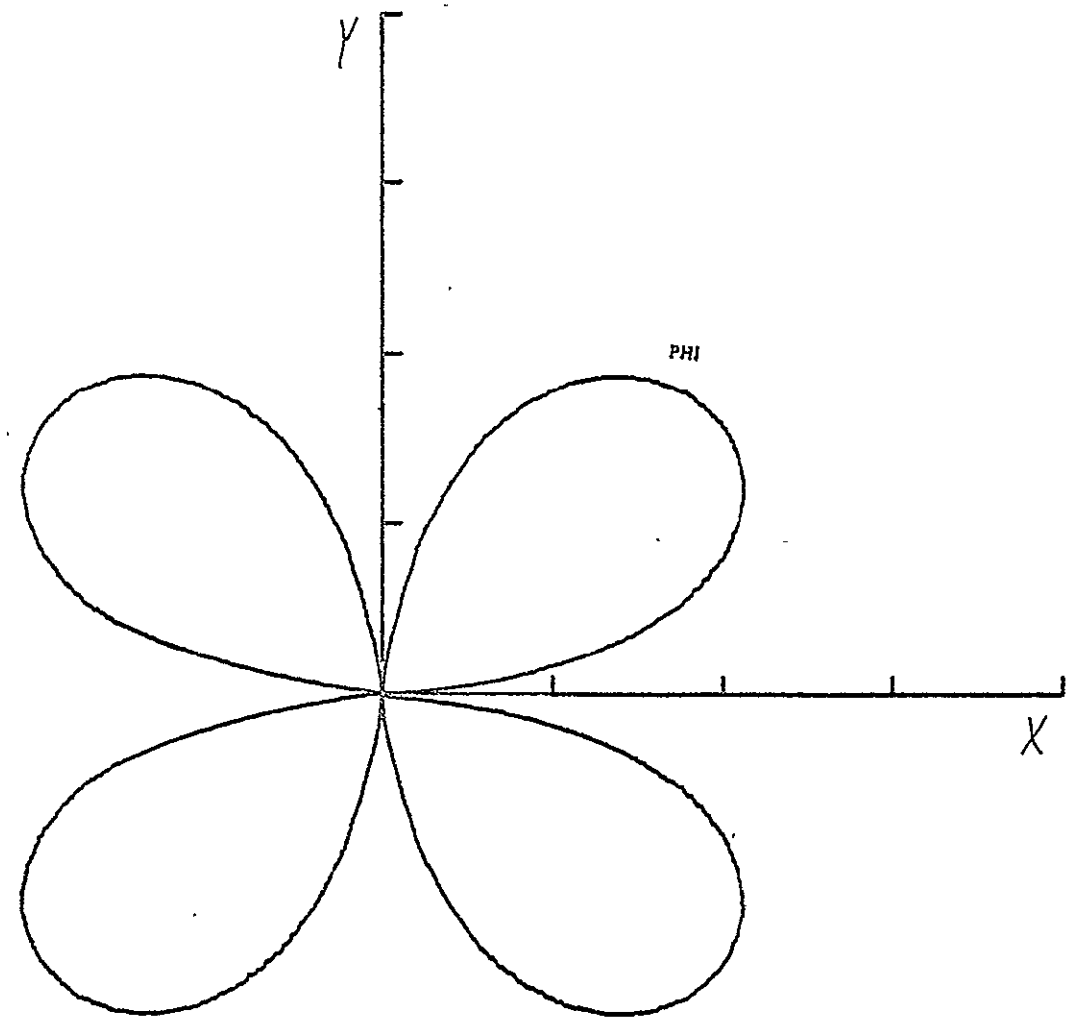

FIGURE B-147

FREQUENCY (MHZ) 1.107
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX — 0.3
DB MIN — 20.3

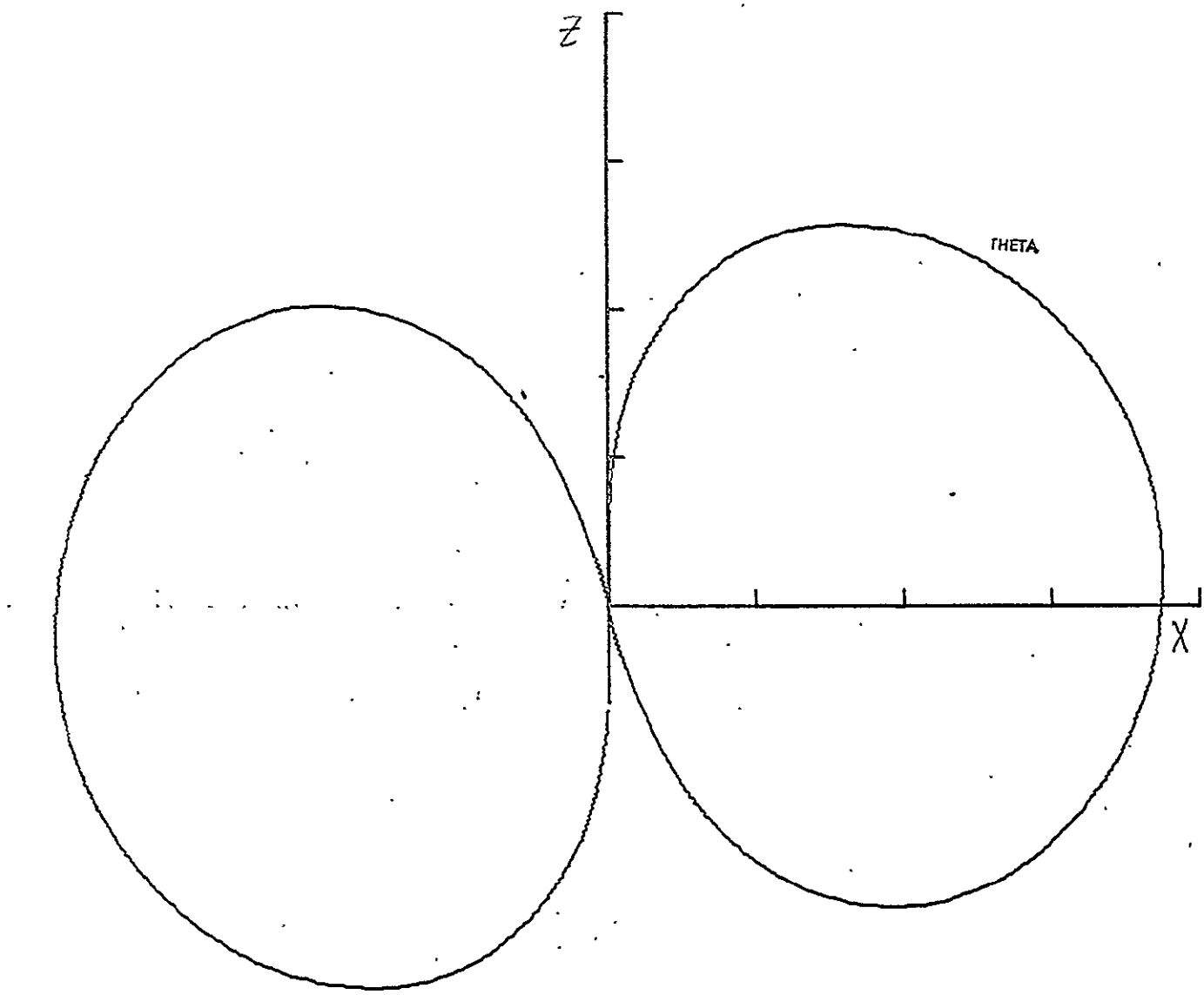

FIGURE B-148

FREQUENCY (MHZ) 1.31
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX + 0.7
DB MIN -19.3

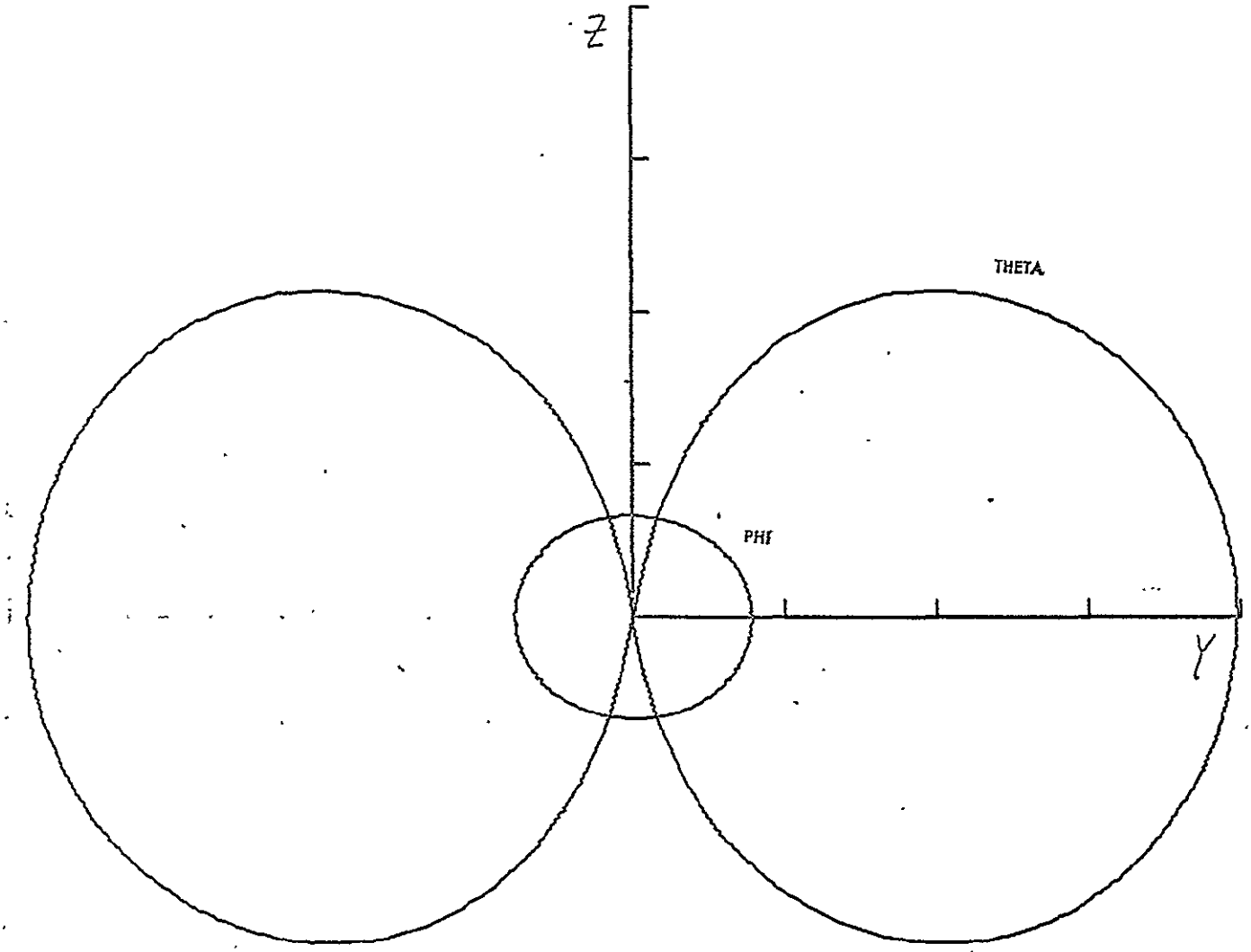

FIGURE B-149

FREQUENCY (MHZ) 1.31
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX + 0.7
DB MIN - 19.3

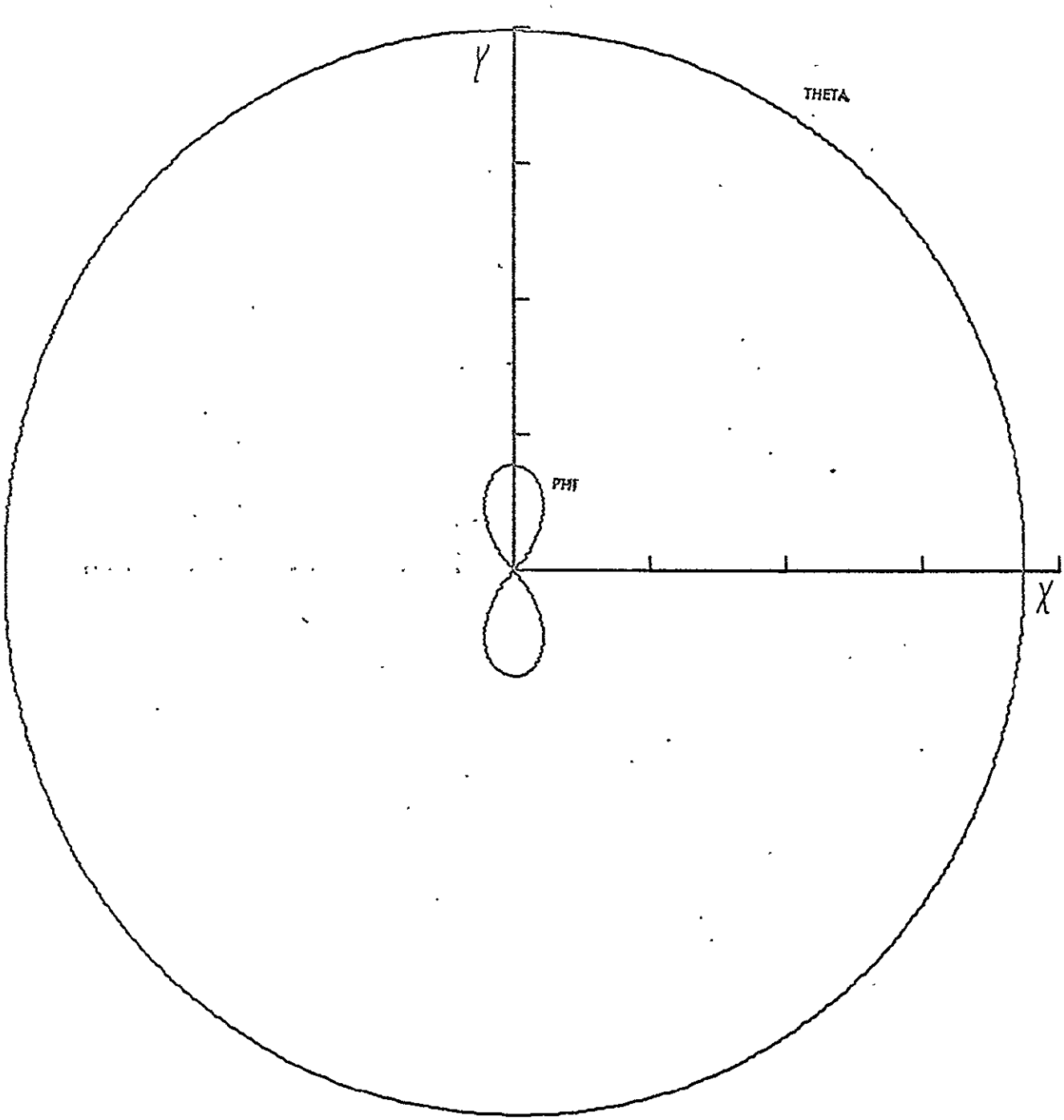

FIGURE B-150

FREQUENCY (MHZ) 1.31
V-ANT. LENGTH (FT) 450.
MODE BALANCED
DB MAX + 0.7
DB MIN -19.3

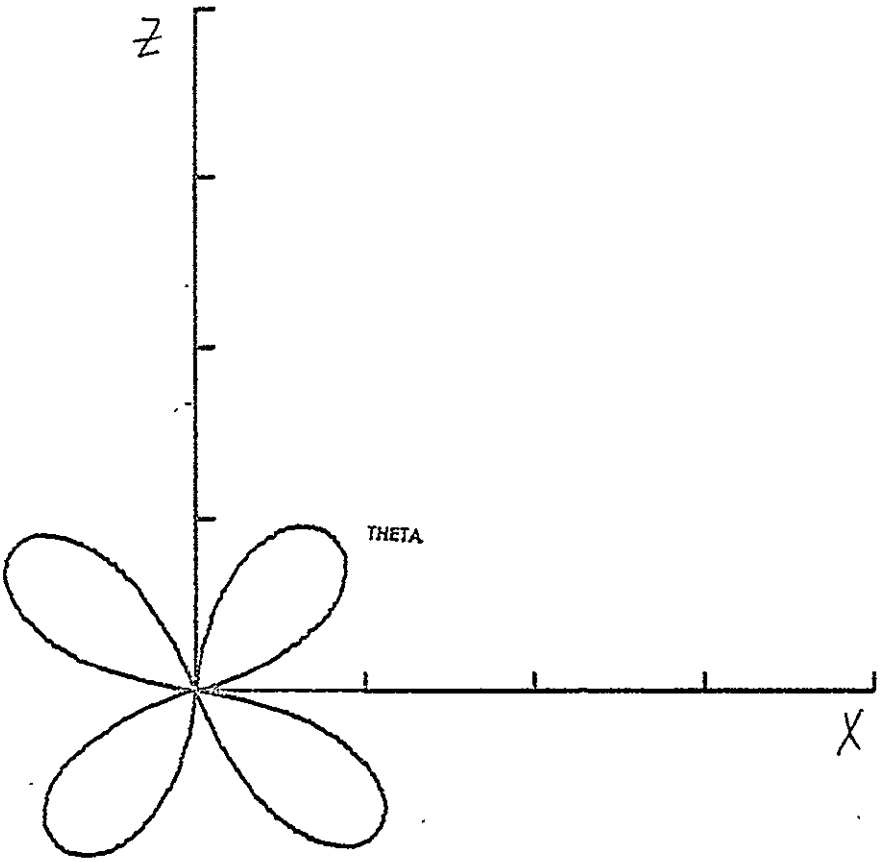

FIGURE B-151

FREQUENCY (MHZ) 1.31
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX + 0.7
DB MIN -19.3

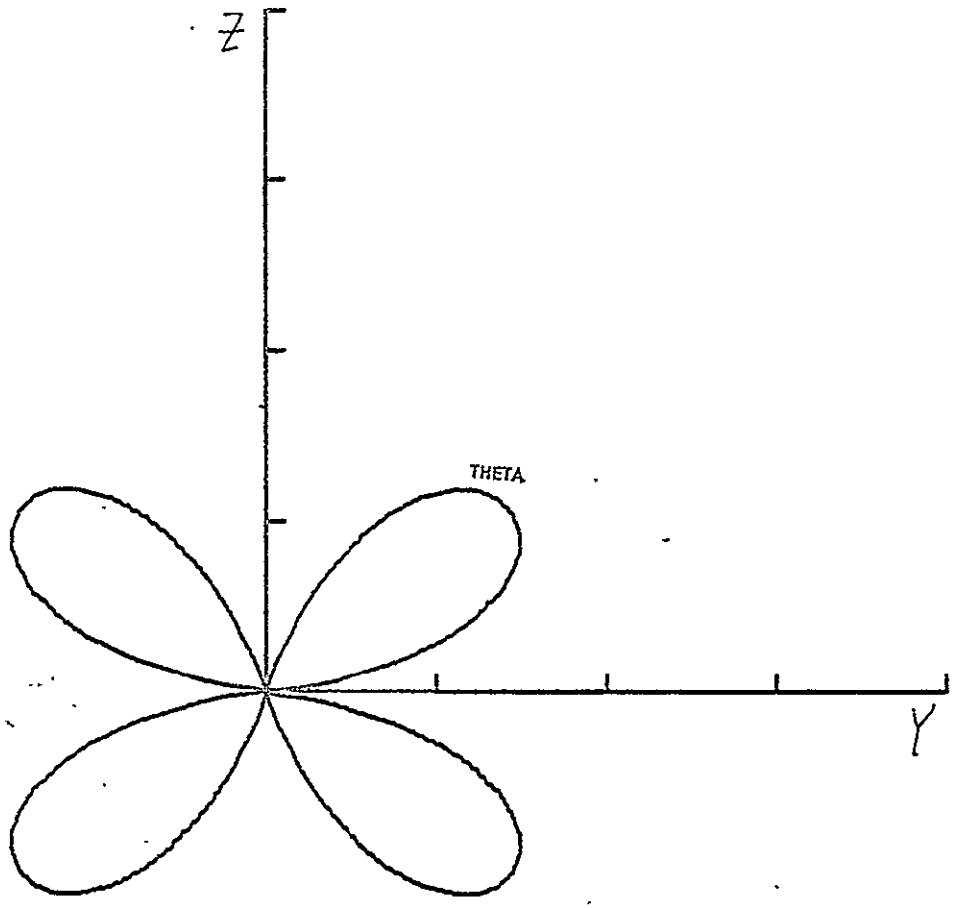

FIGURE B-152

FREQUENCY (MHZ) 1.31
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX + 0.7
DB MIN -19.3

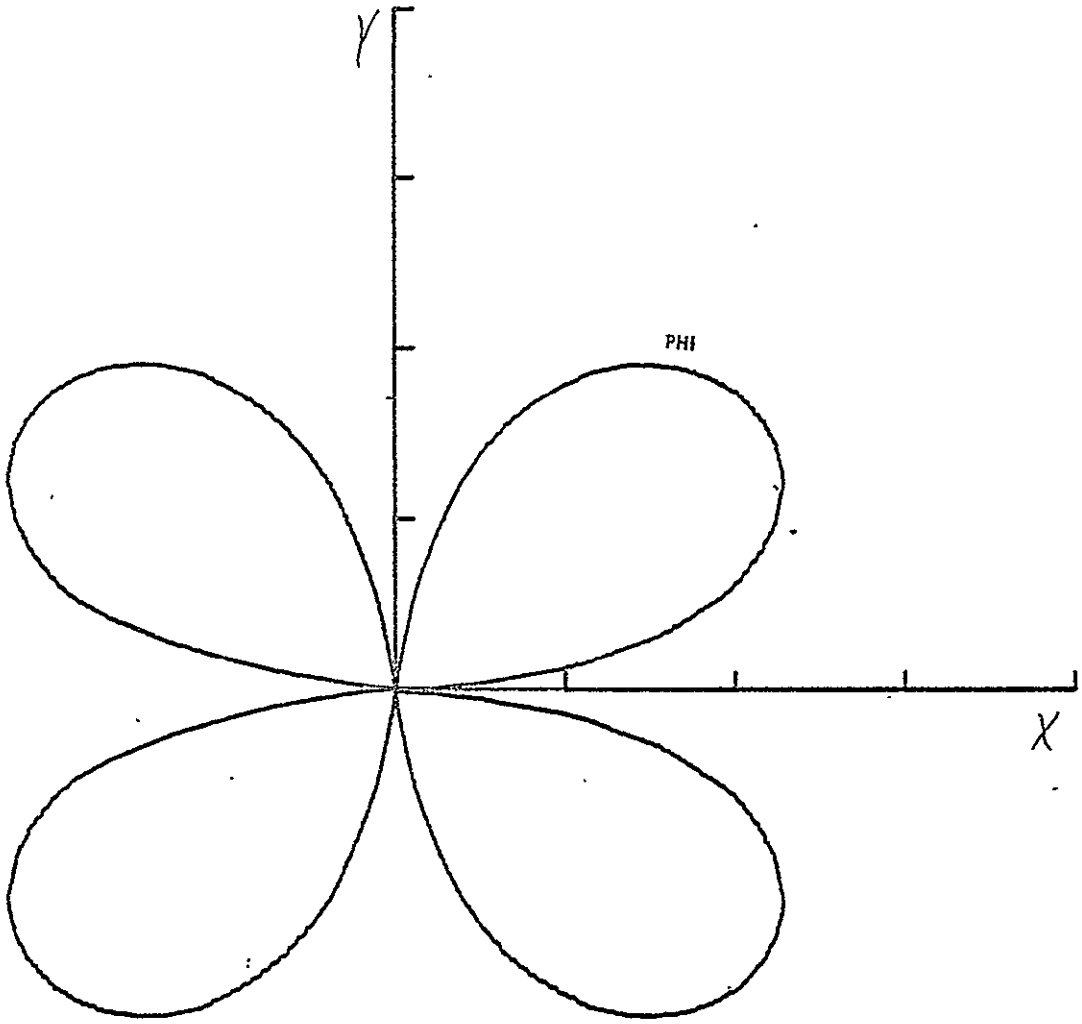

FIGURE B-153

FREQUENCY (MHZ) 1.31
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX + 0.7
DB MIN -19.3

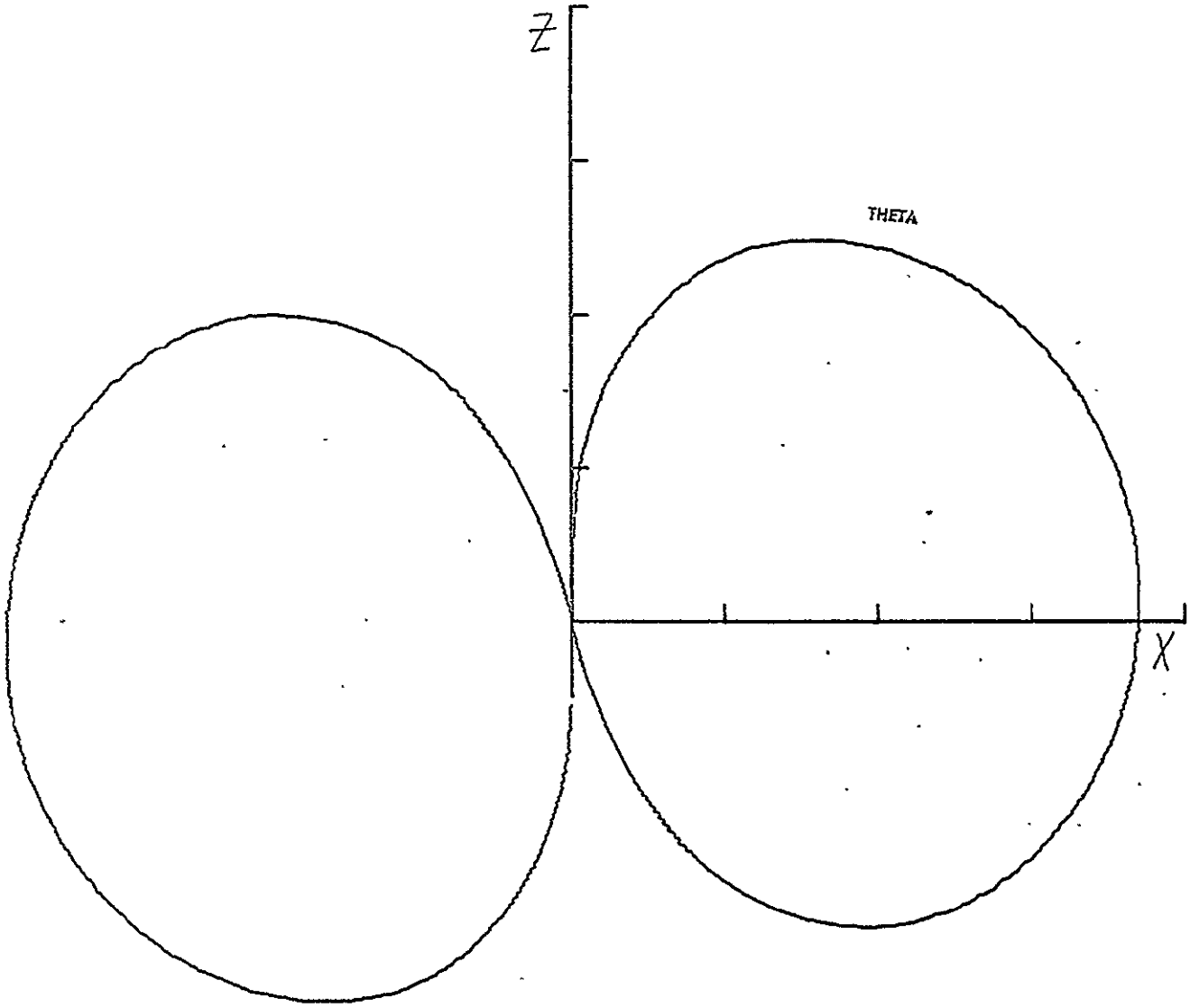

FIGURE B-154

FREQUENCY (MHZ) 1.65
V-ANT. LENGTH (FT) .450
MODE BALANCED
DB MAX + 1.1
DB MIN -18.9

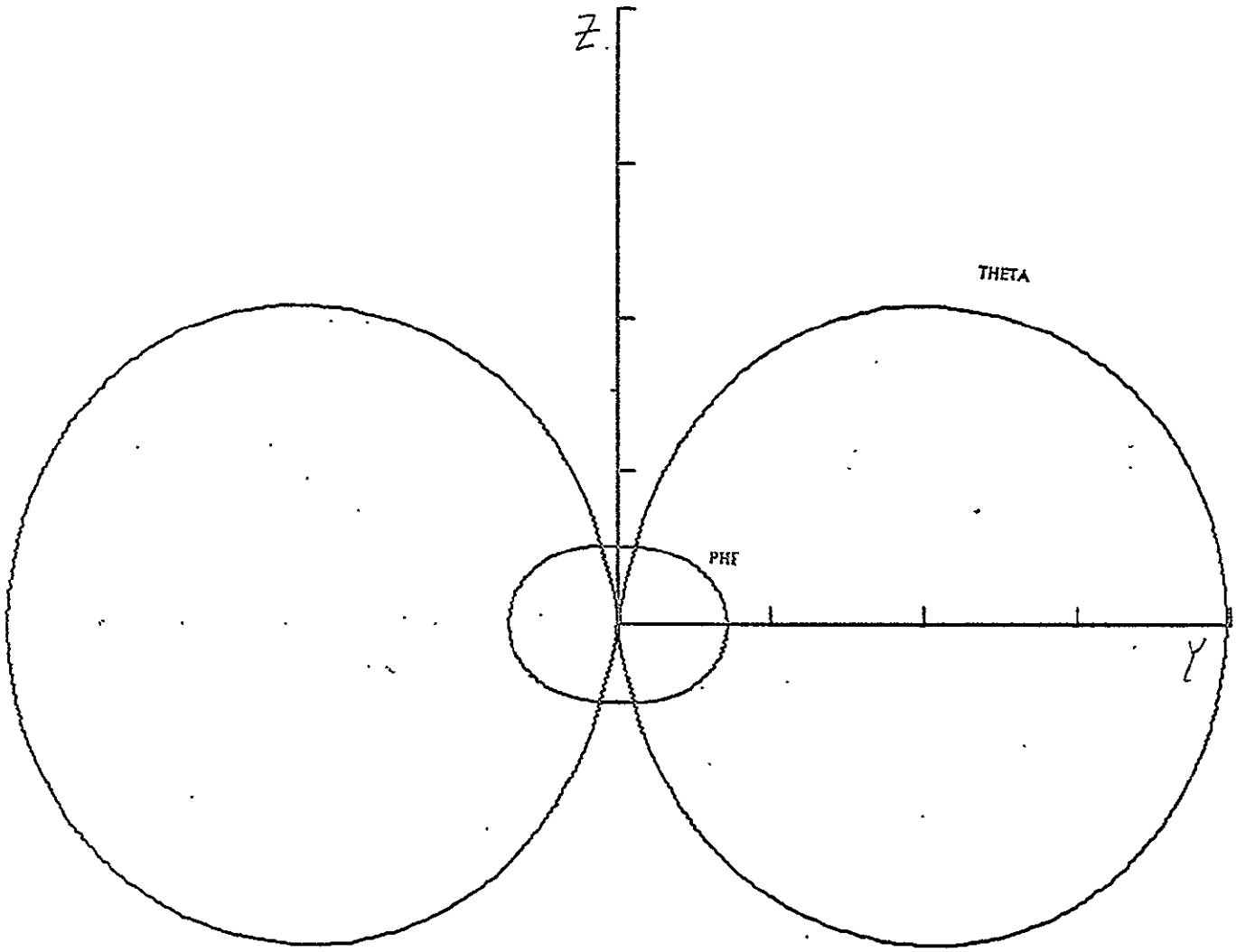

FIGURE B-155

FREQUENCY (MHZ) 1.65
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX + 1.1
DB MIN -18.9

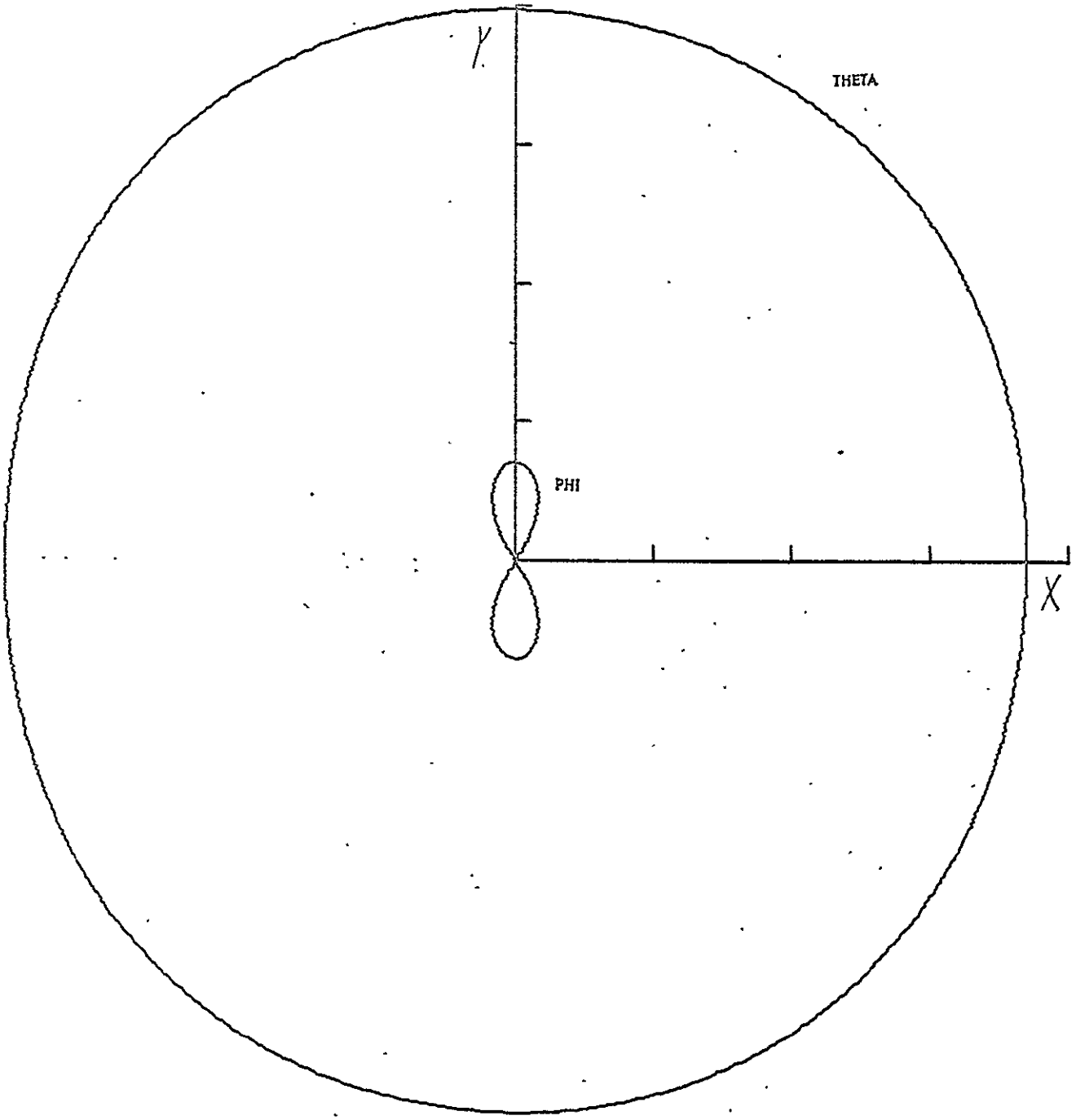

FIGURE B-156

FREQUENCY (MHZ) 1.65
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX + 1.1
DB MIN - 18.9

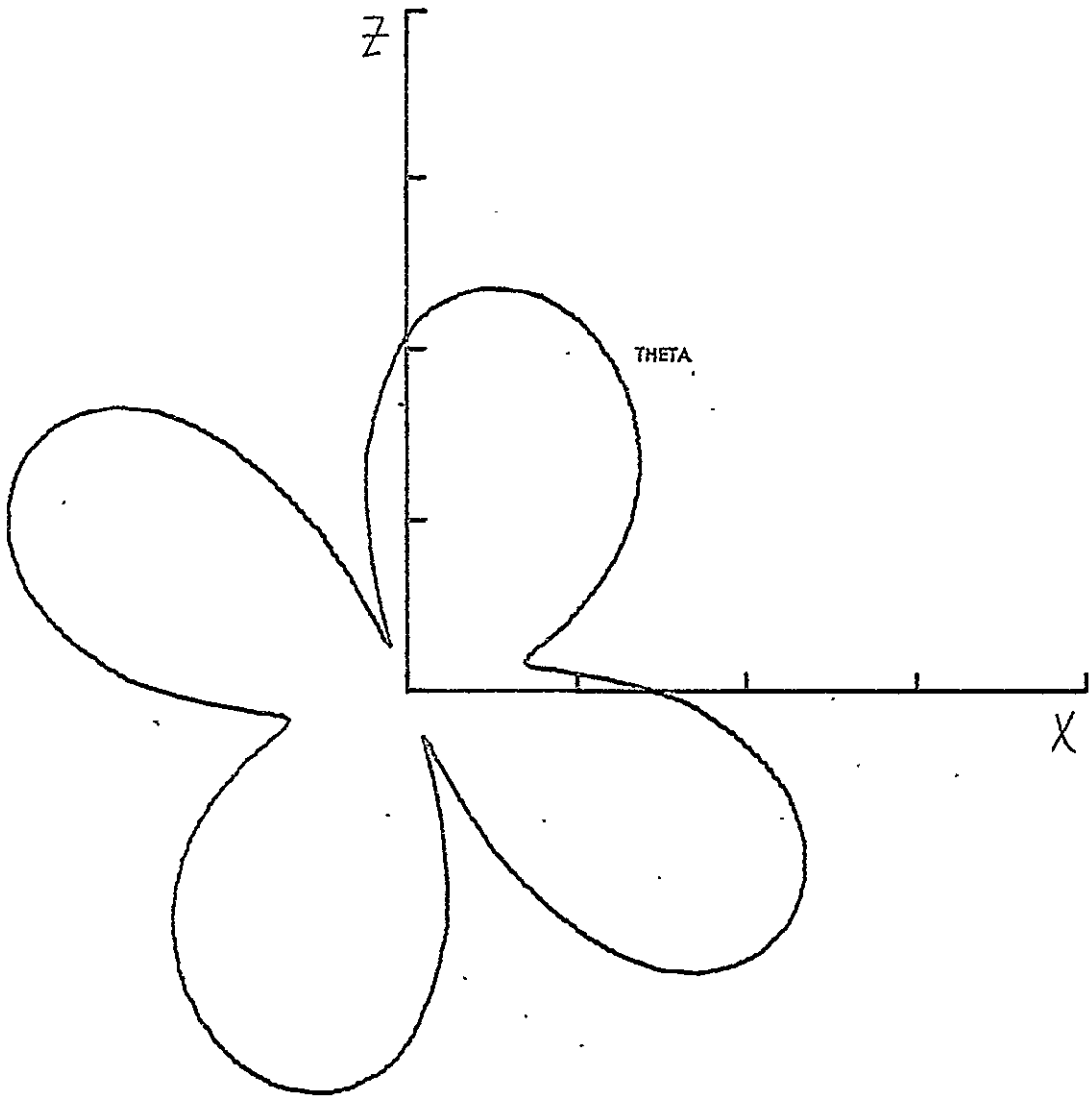

FIGURE B-157

FREQUENCY (MHZ) 1.65
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX + 1.1
DB MIN −18.9

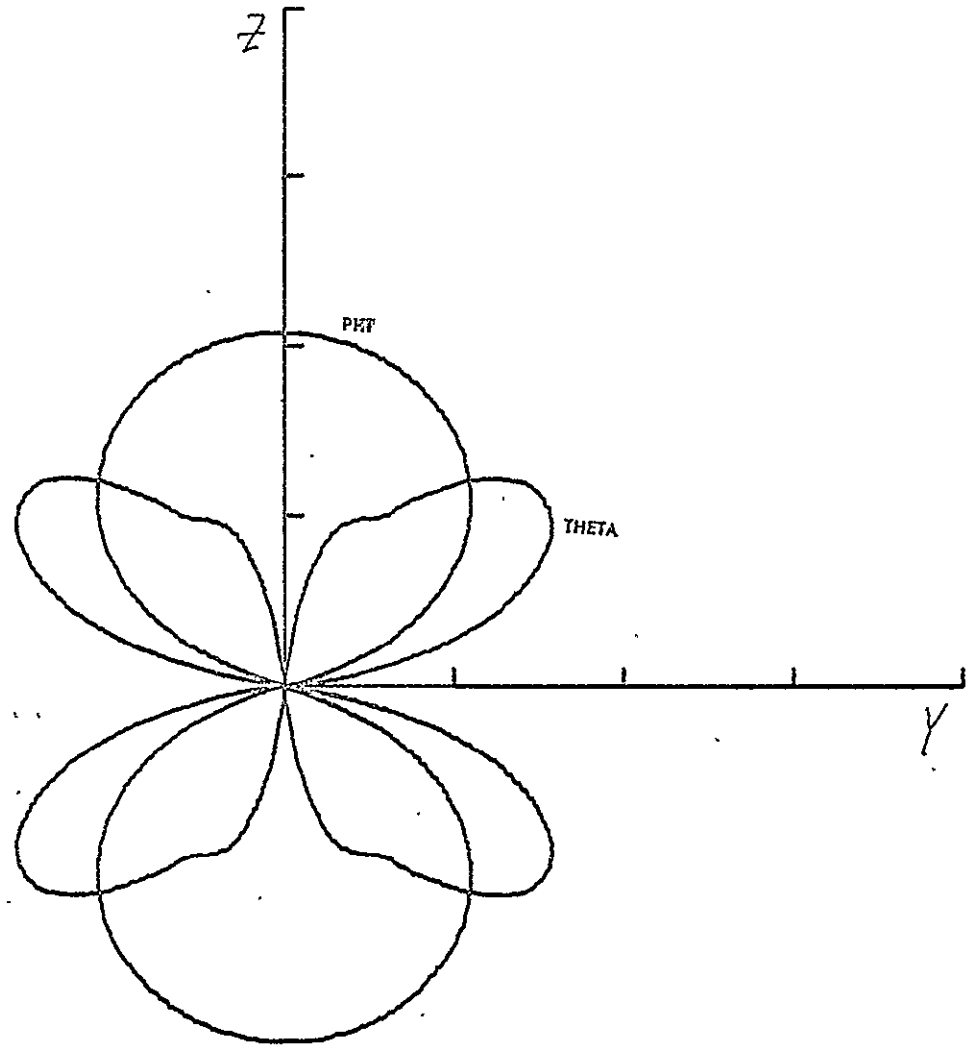

FIGURE B-158

FREQUENCY (MHZ) 1.65
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX + 1.1
DB MIN − 18.9

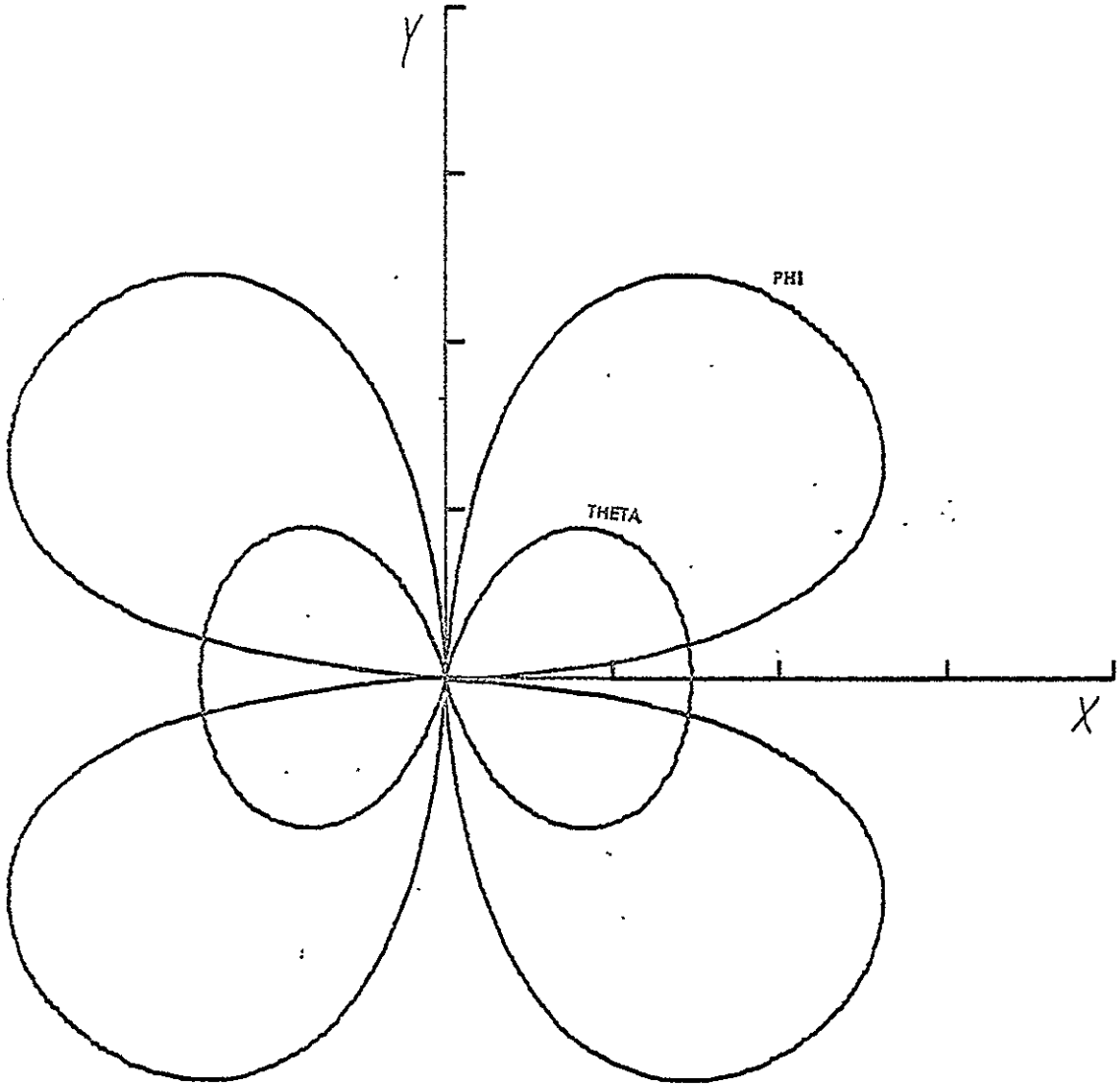

FIGURE B-159

FREQUENCY (MHZ) 1.65
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX + 1.1
DB MIN -18.9

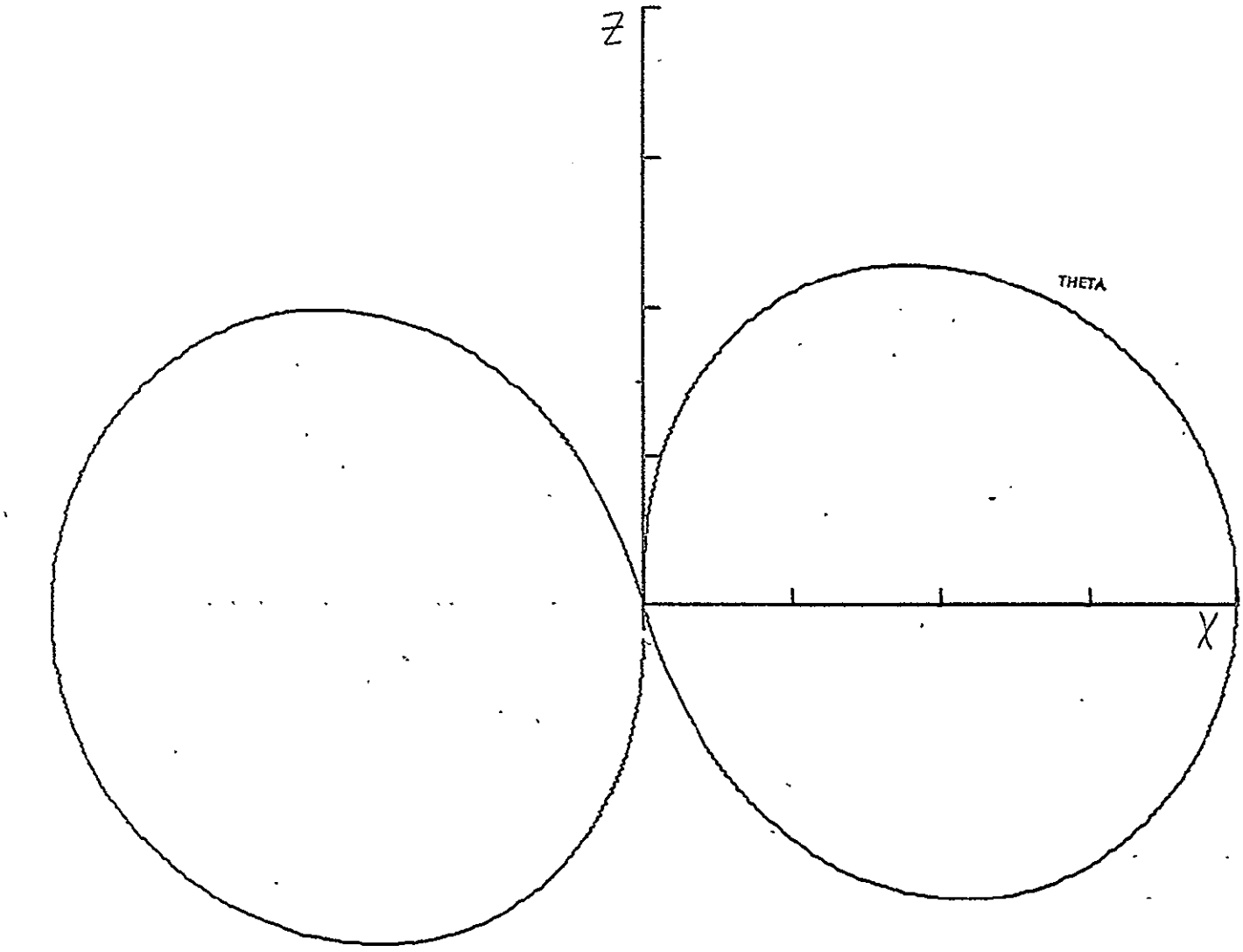

FIGURE B-160

FREQUENCY (MHZ) 2.20
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX + 2.0
DB MIN -18.0

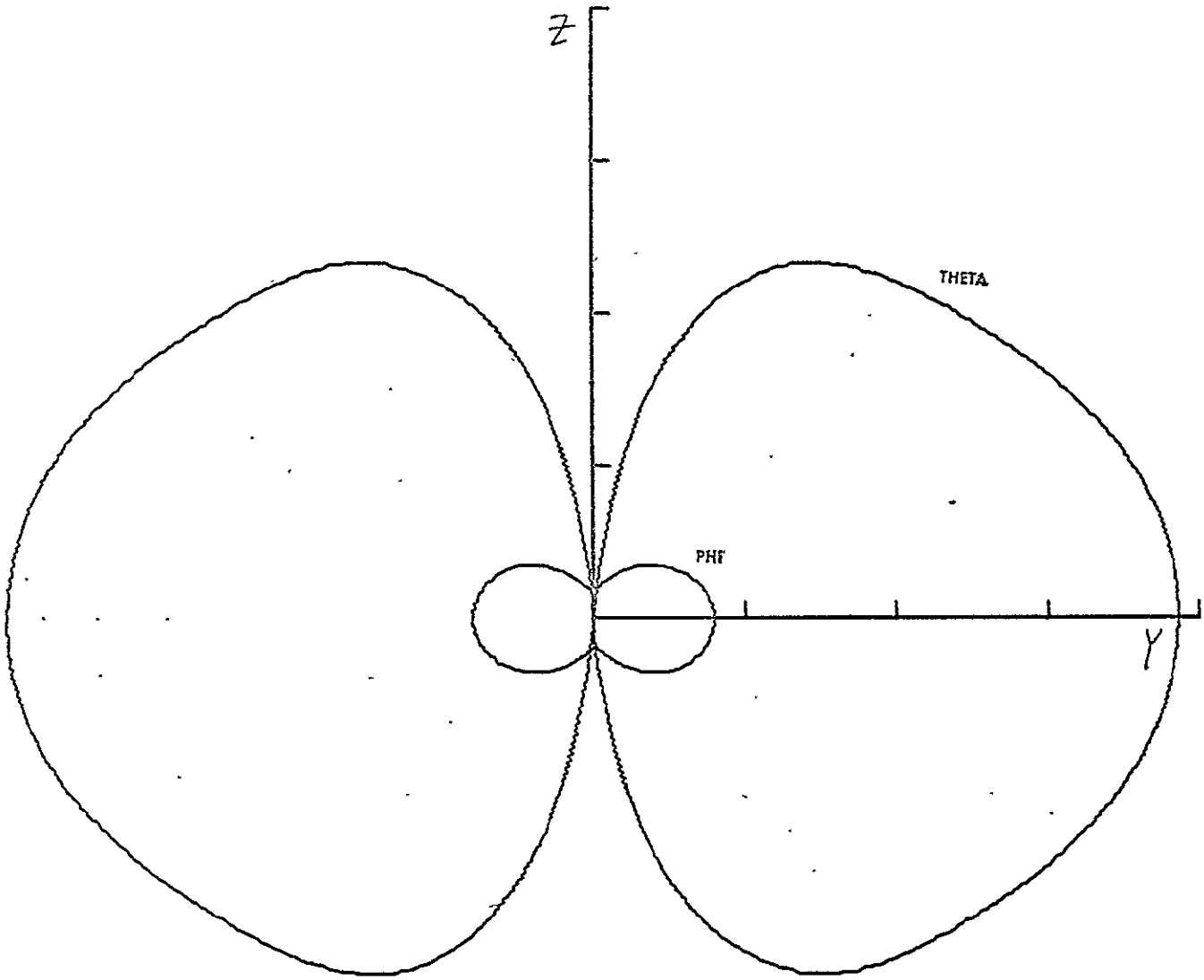

FIGURE B-161

FREQUENCY (MHZ) 2.20
Y-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX + 2.0
DB MIN -18.0

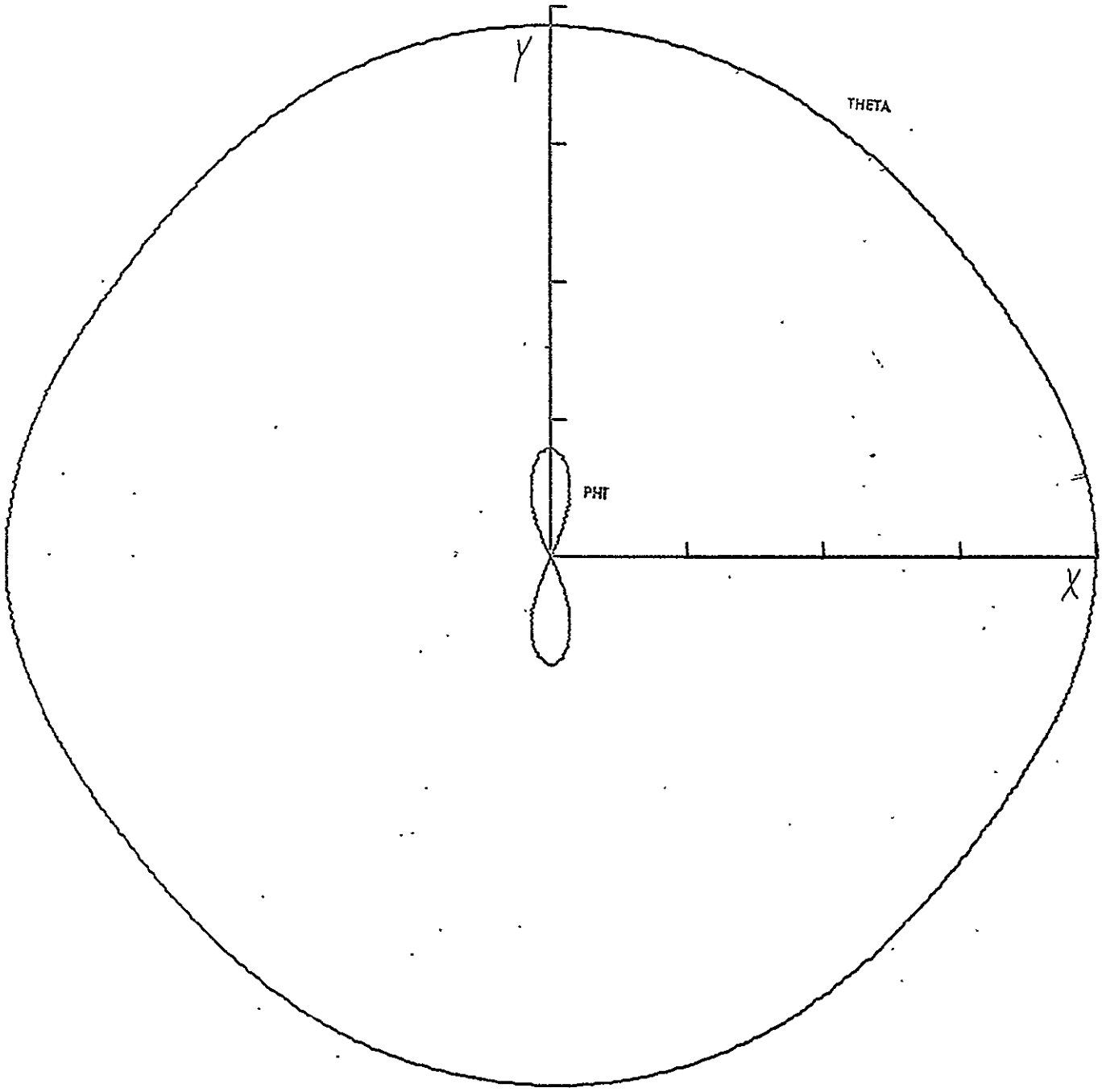

FIGURE B-162

FREQUENCY (MHZ) 2.20
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX + 2.0
DB MIN -18.0

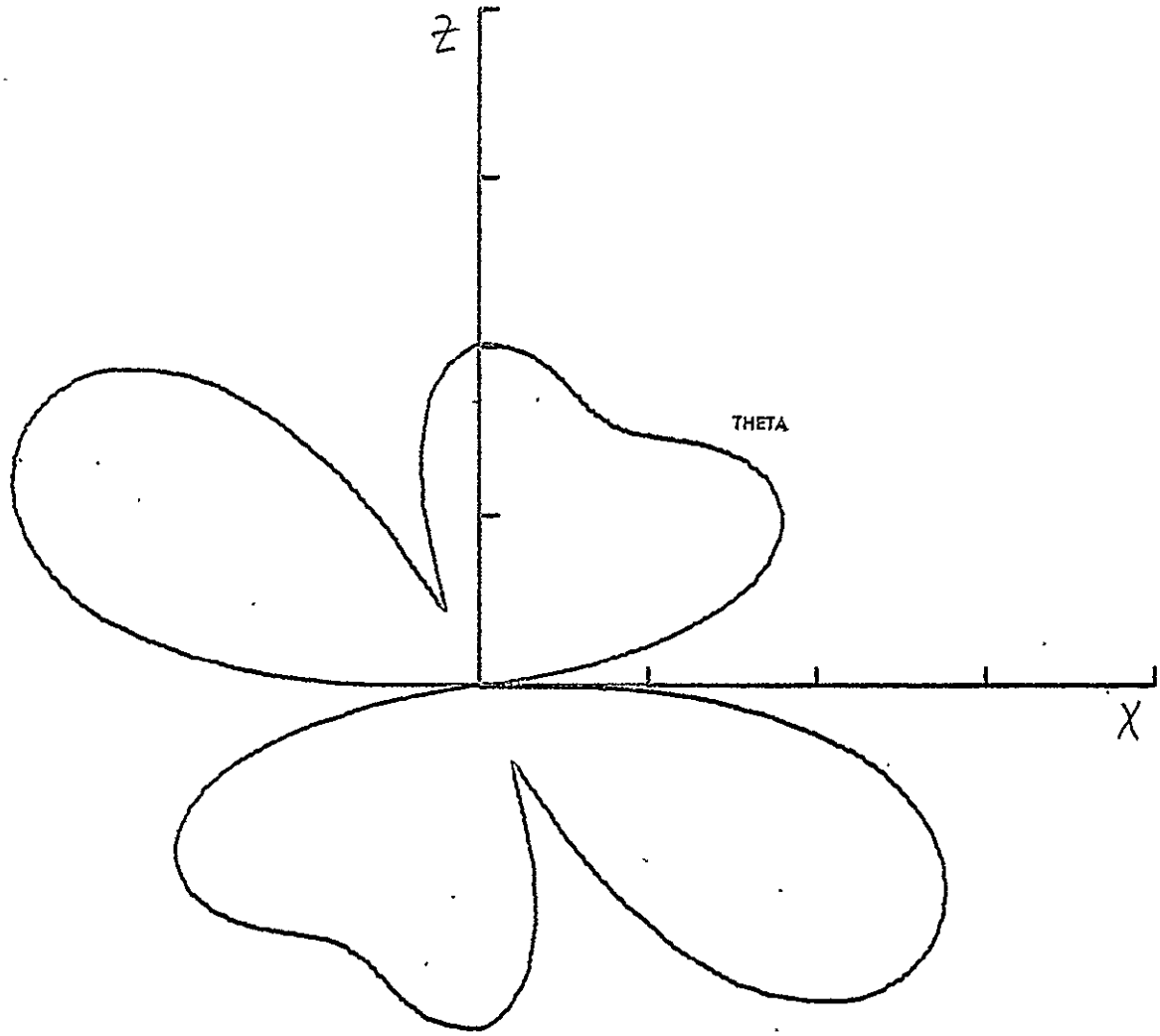

FIGURE B-163

FREQUENCY (MHZ) 2.20
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX + 2.0
DB MIN -18.0

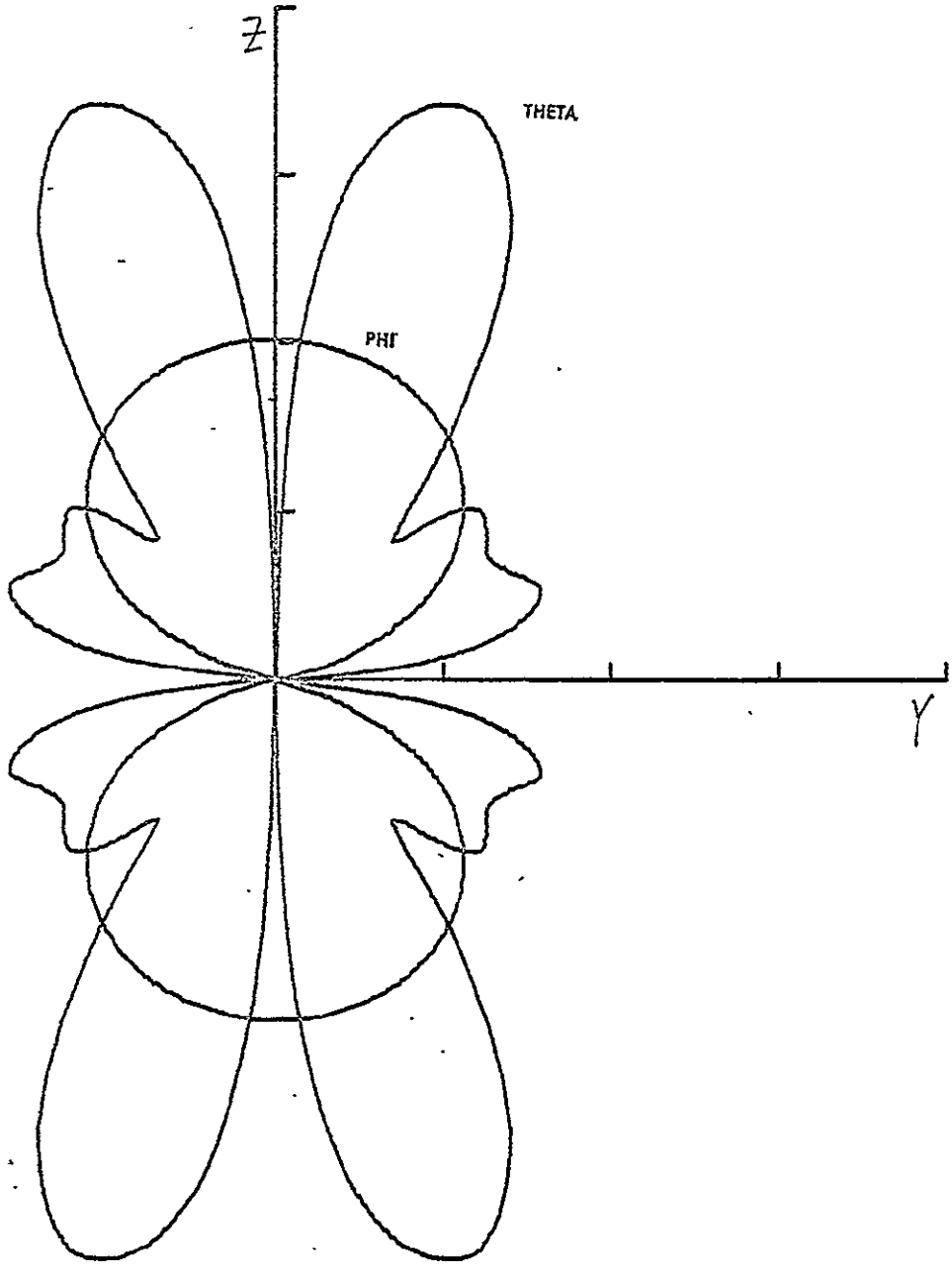

FIGURE B-164

FREQUENCY (MHZ) 2.20
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX + 2.0
DB MIN -18.0

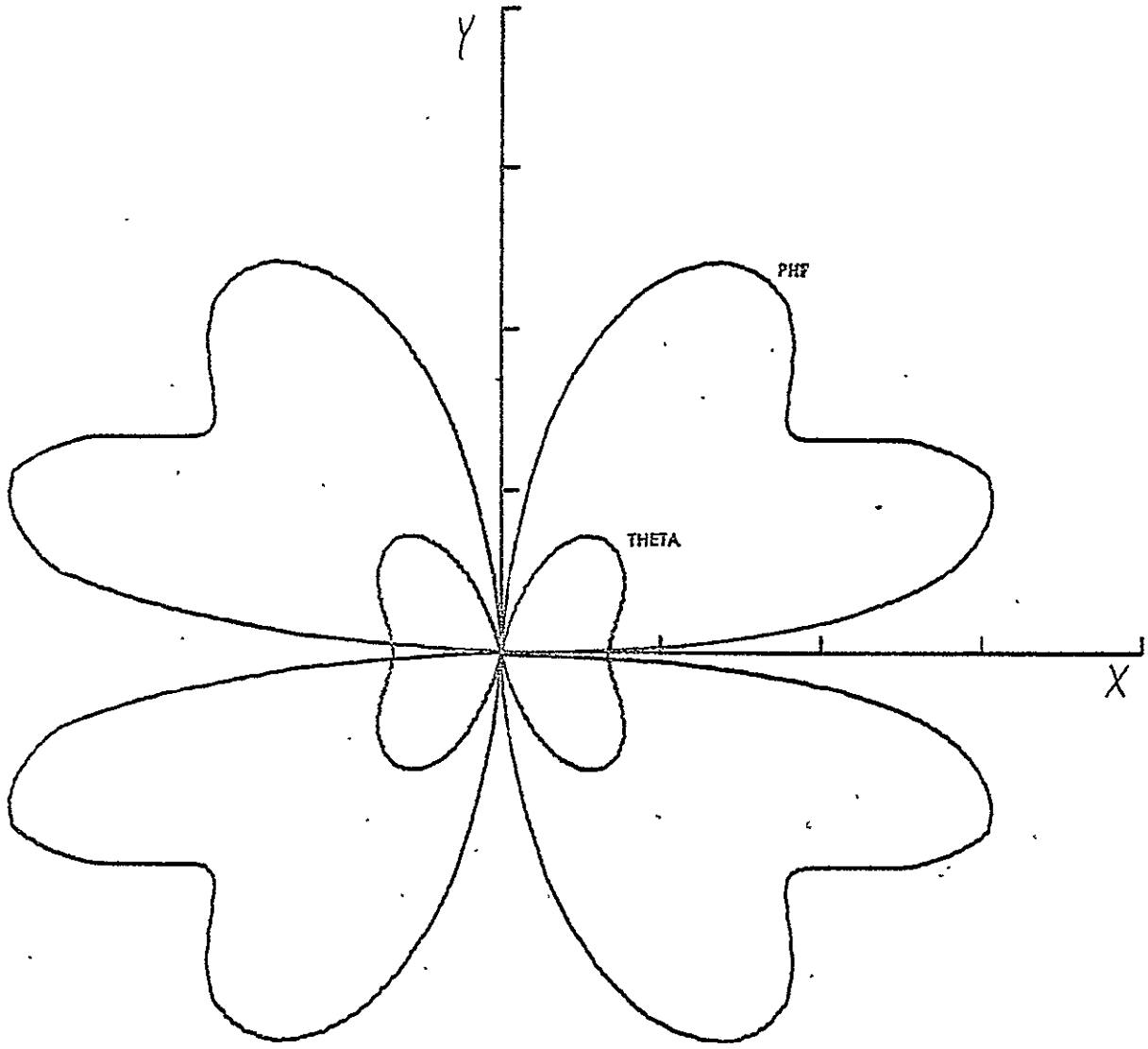

FIGURE B-165

FREQUENCY (MHZ) 2.20
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX + 2.0
DB MIN -18.0

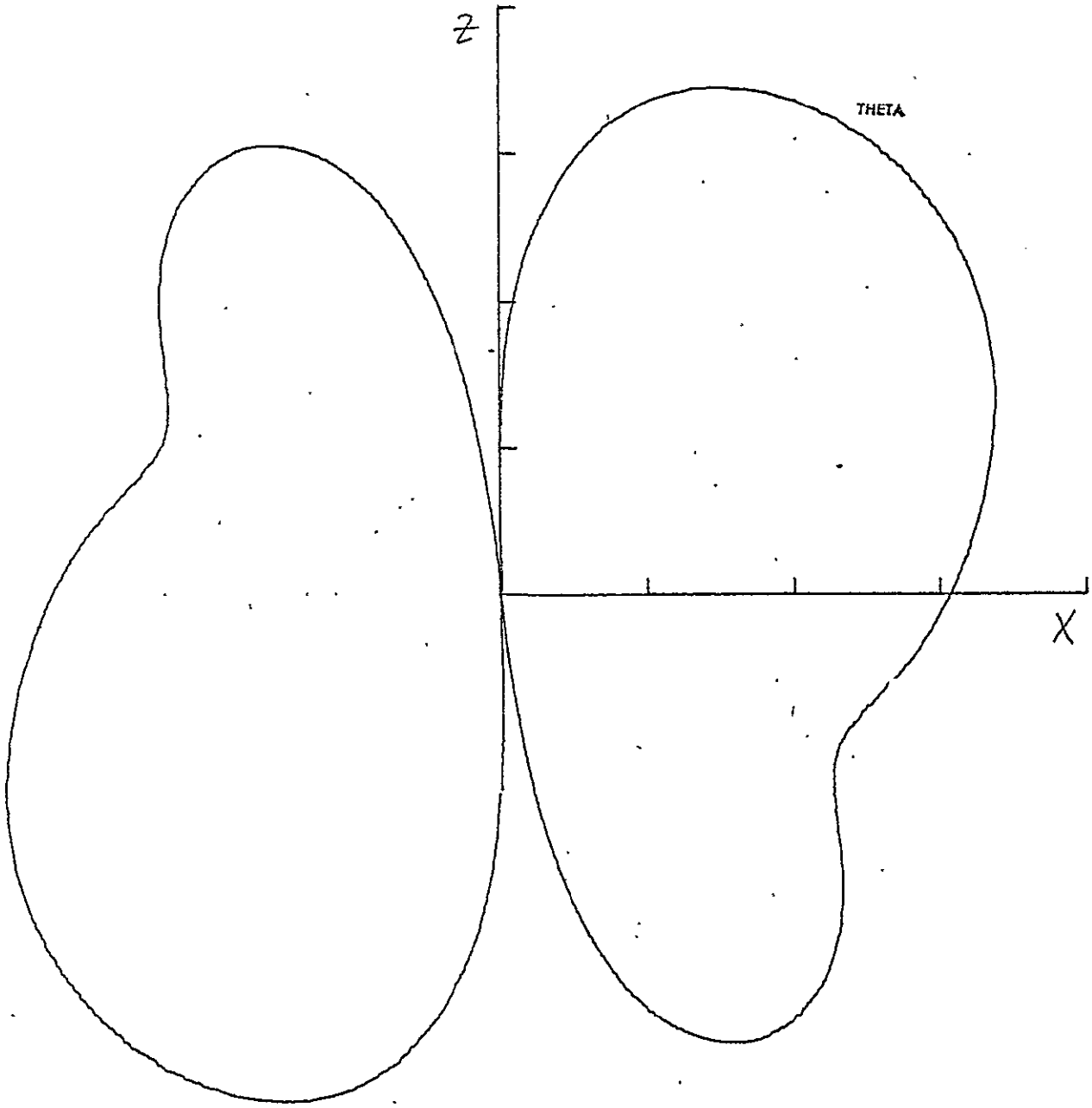

FIGURE B-166

FREQUENCY (MHZ) 2.80
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX + 0.9
DB MIN - 19.1

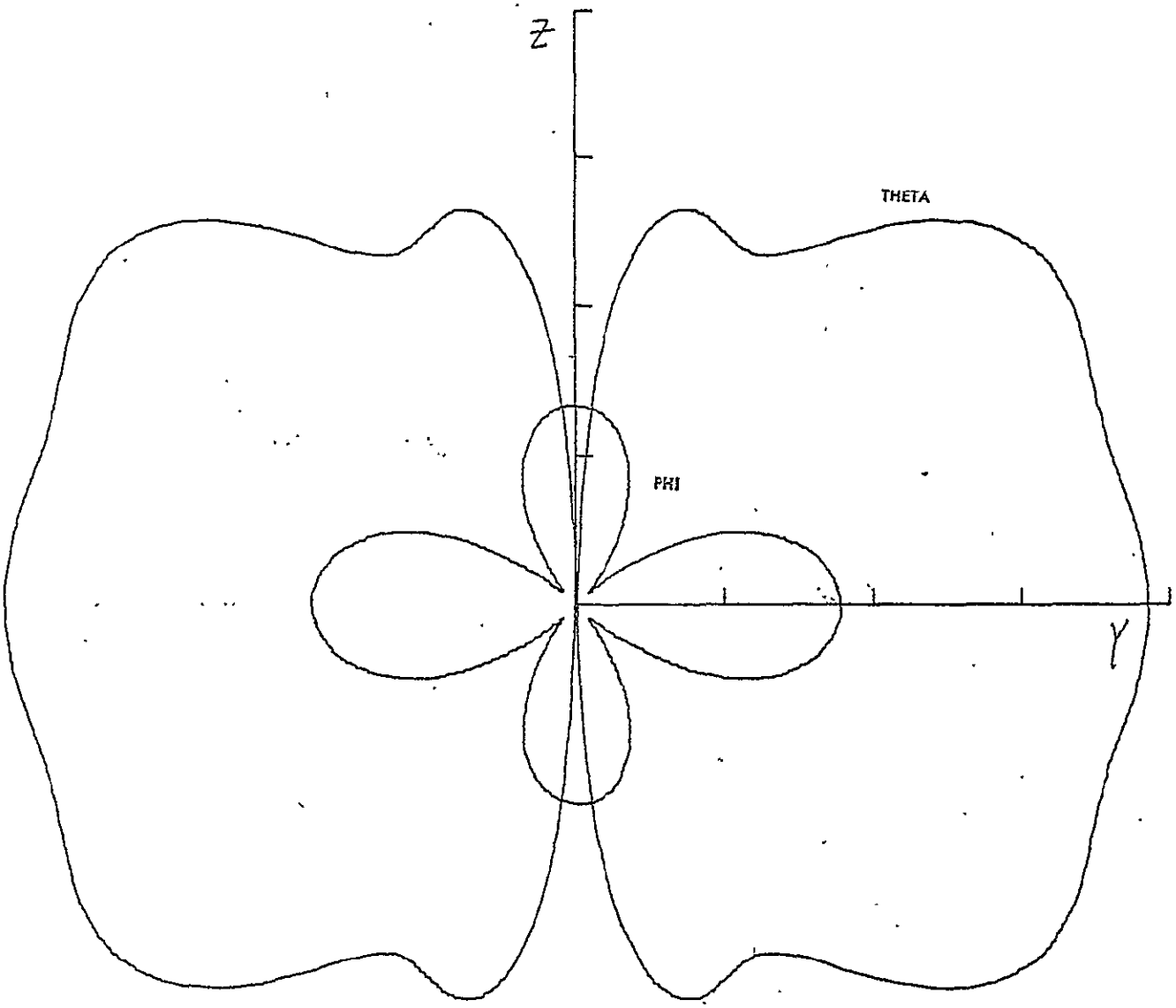

FIGURE B-167

FREQUENCY (MHZ) 2.80
Y-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX + 0.9
DB MIN -19.1

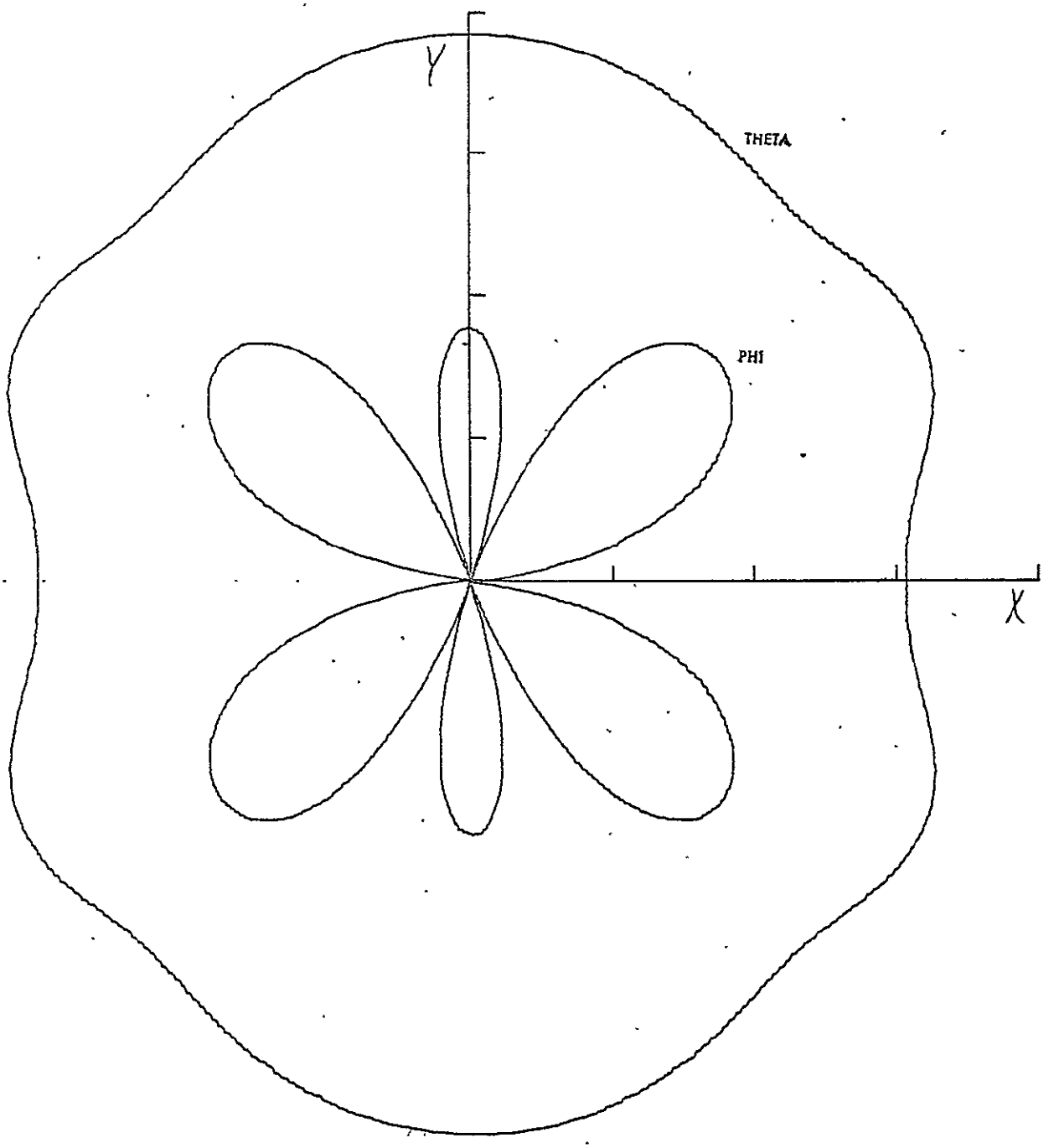

FIGURE B-168

FREQUENCY (MHZ) 2.80
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX + 0.9
DB MIN -19.1

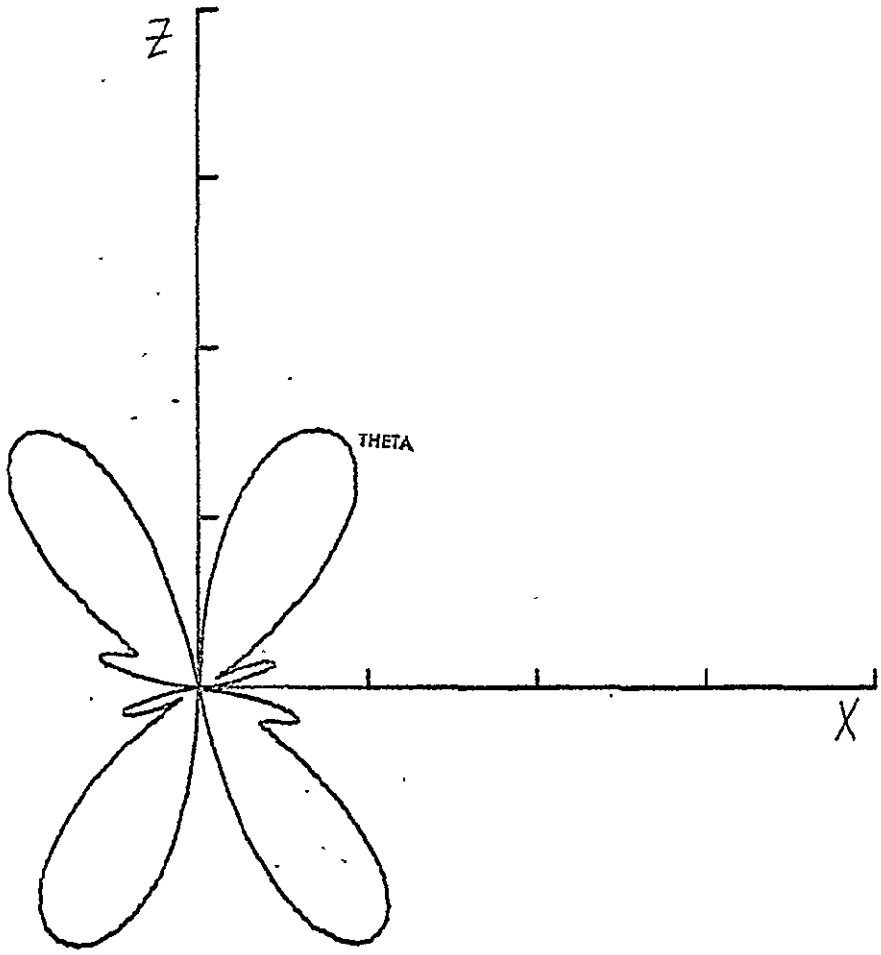

FIGURE B-169

FREQUENCY (MHZ) 2.80
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX + 0.9
DB MIN - 19.1

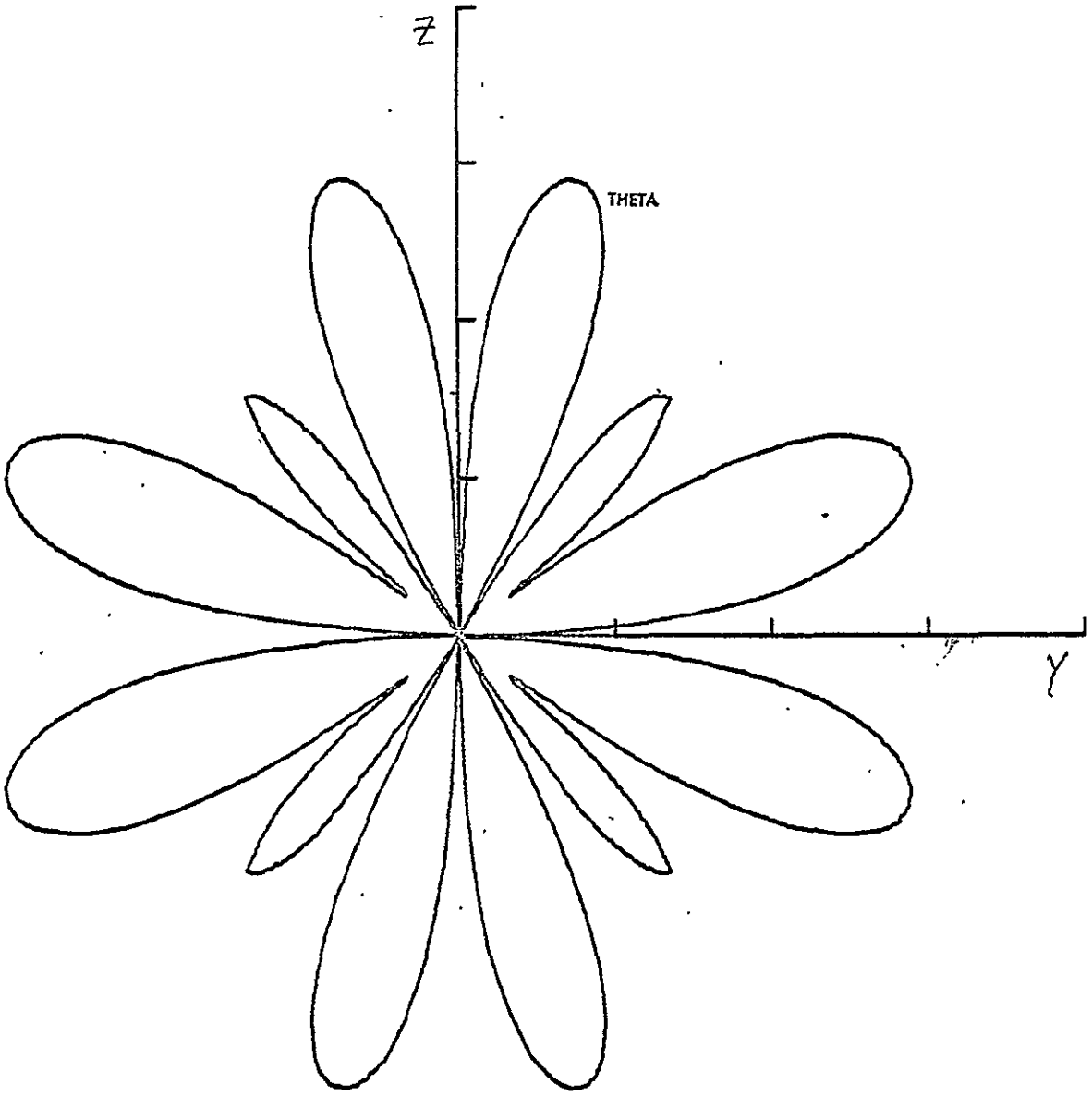

FIGURE B-170
FREQUENCY (MHZ) 2.80
ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX + 0.9
DB MIN - 19.1

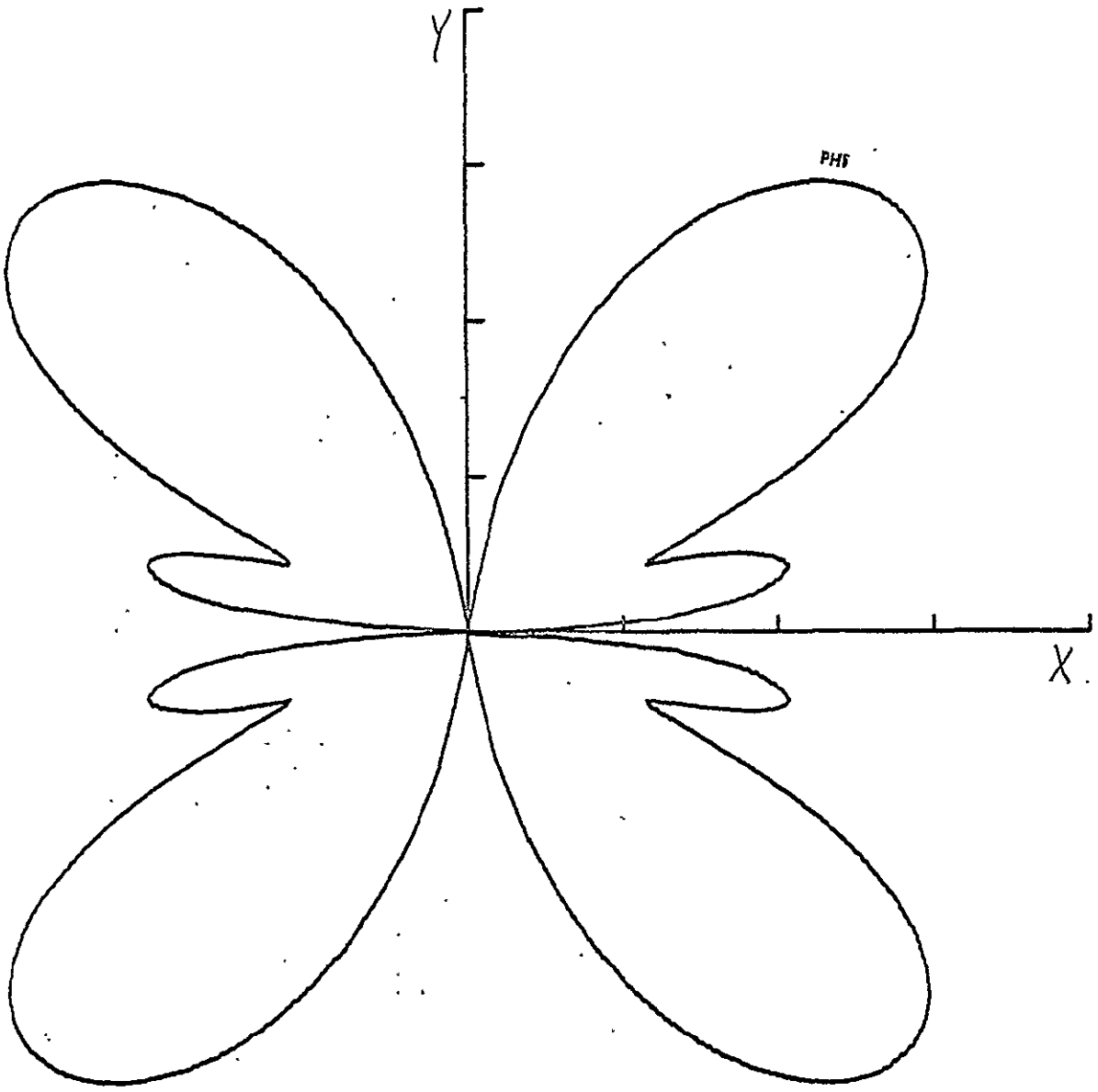

FIGURE B-171

FREQUENCY (MHZ) 2.80
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX + 0.9
DB MIN -19.1

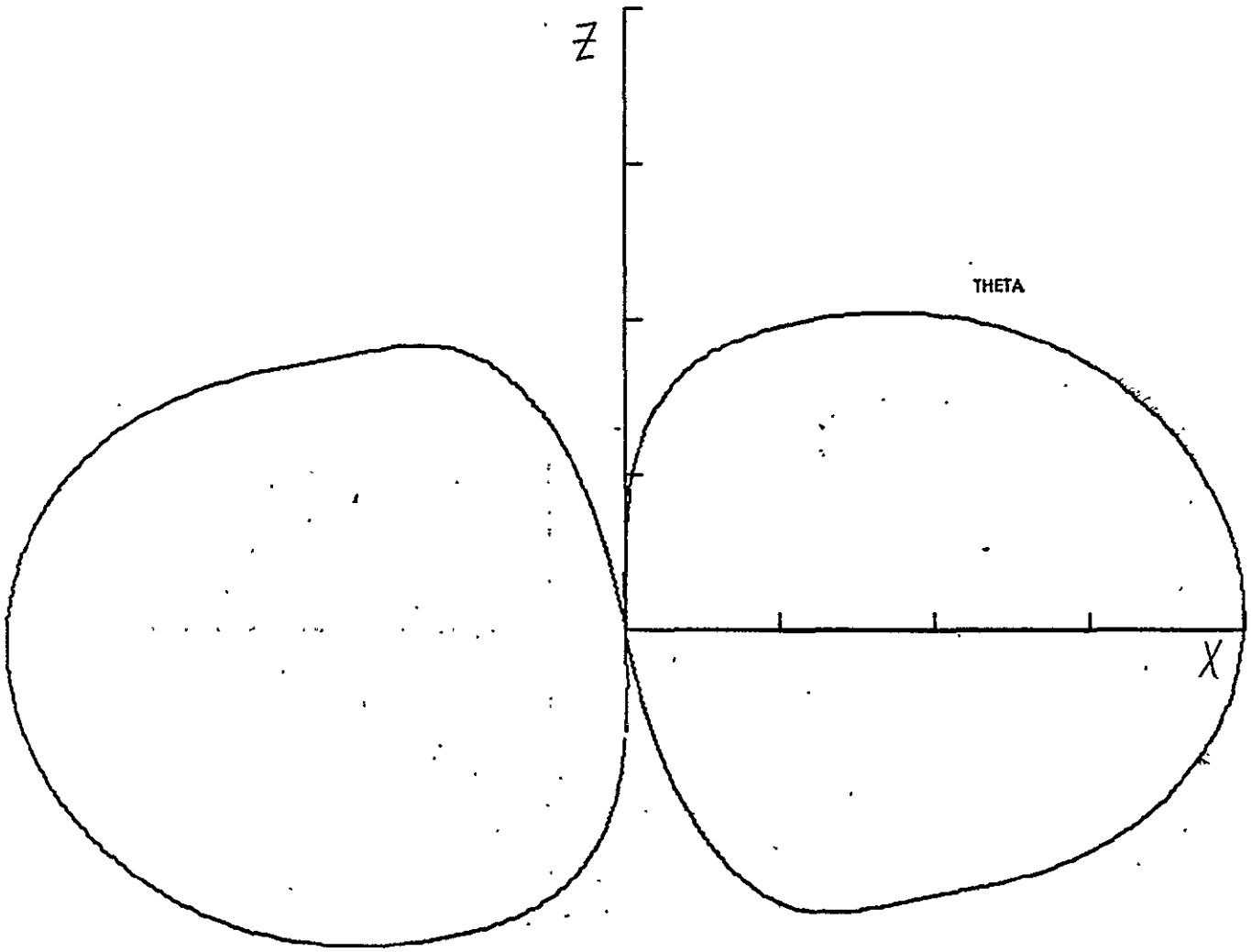

FIGURE B-172

FREQUENCY (MHZ) 3.93
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX + 2.9
DB MIN -17.1

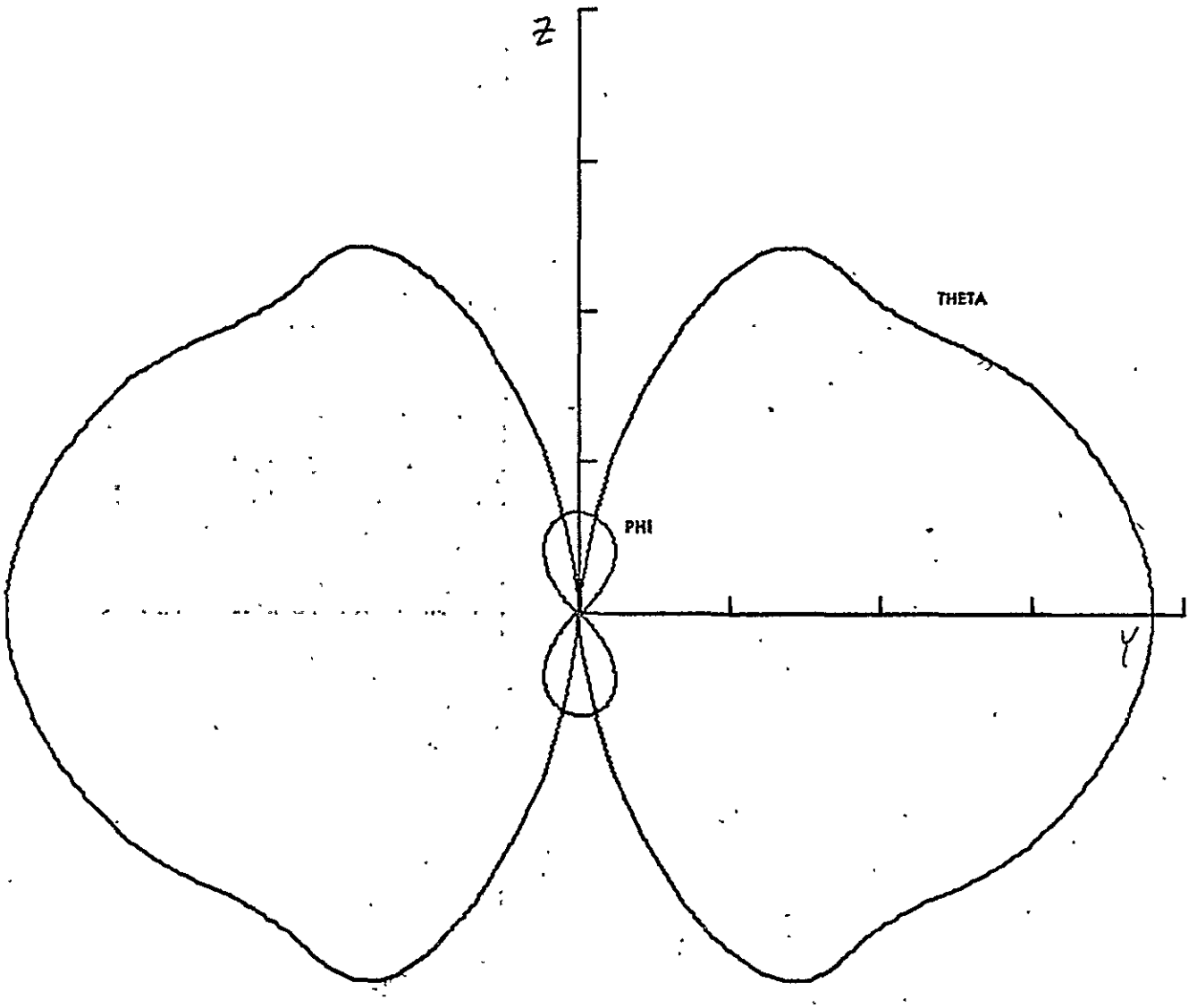

FIGURE B-173

FREQUENCY (MHZ) 3.93
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX + 2.9
DB MIN -17.1

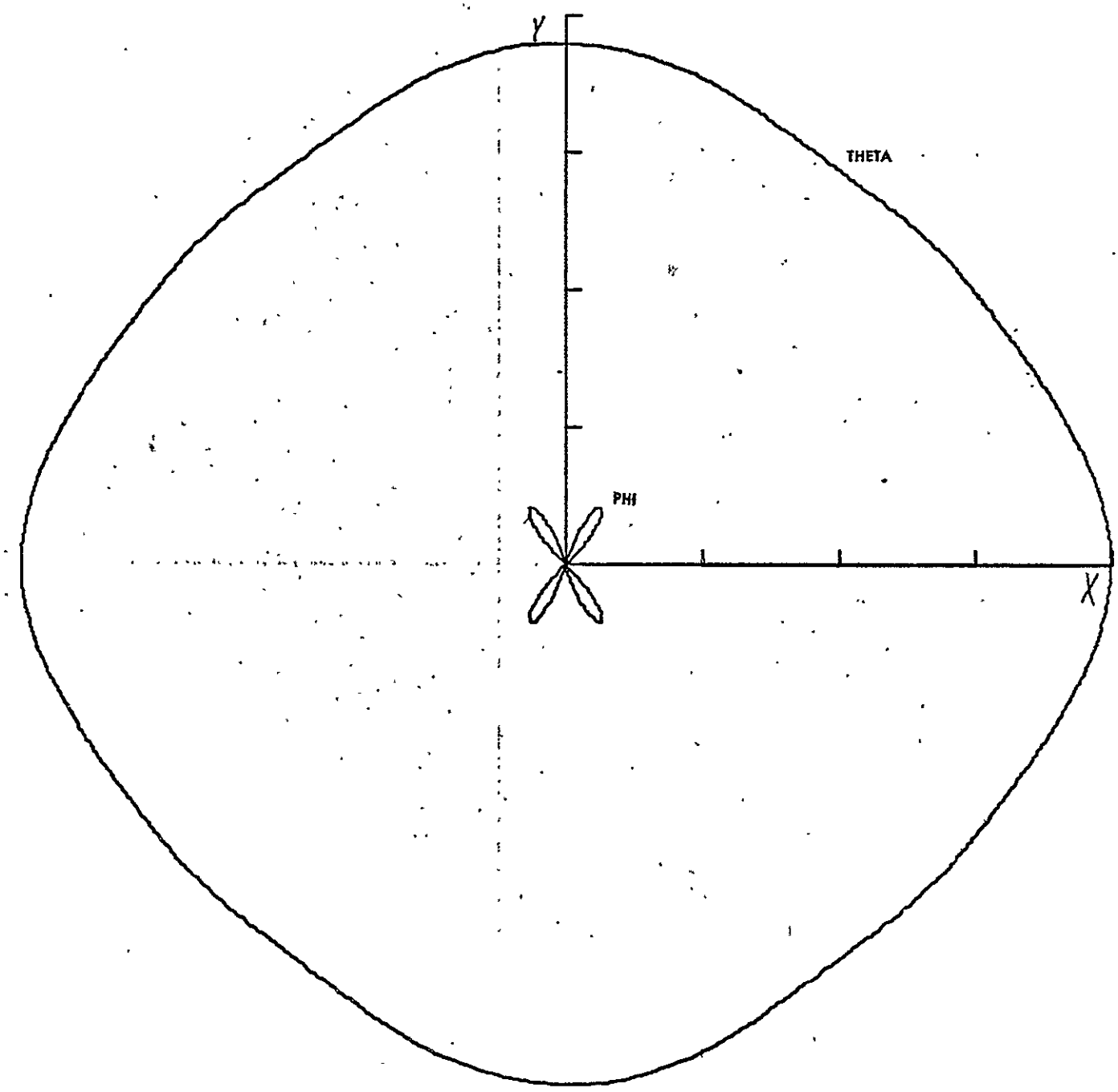

FIGURE B-174

FREQUENCY (MHZ) 3.93
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX + 2.9
DB MIN -17.1

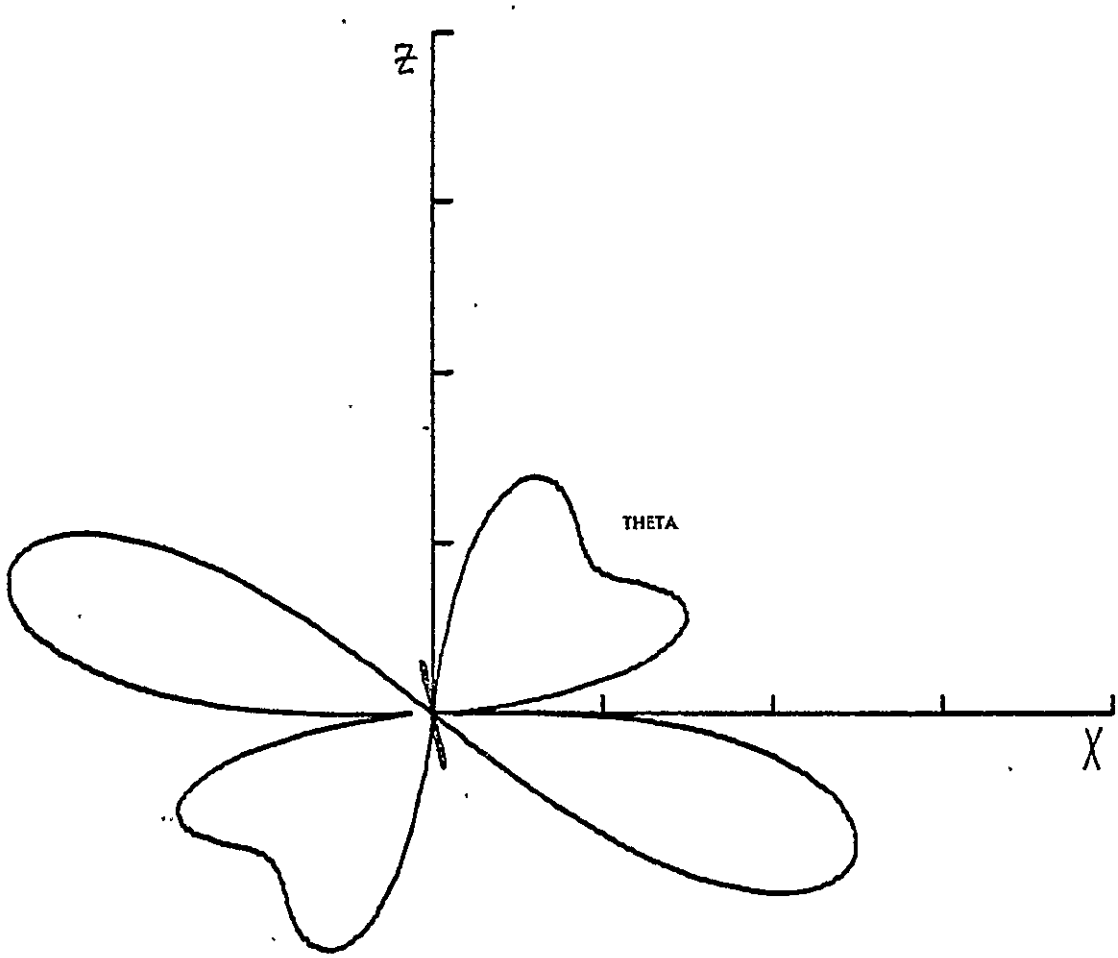

FIGURE B-175

FREQUENCY (MHZ) 3.93
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX + 2.9
DB MIN -17.1

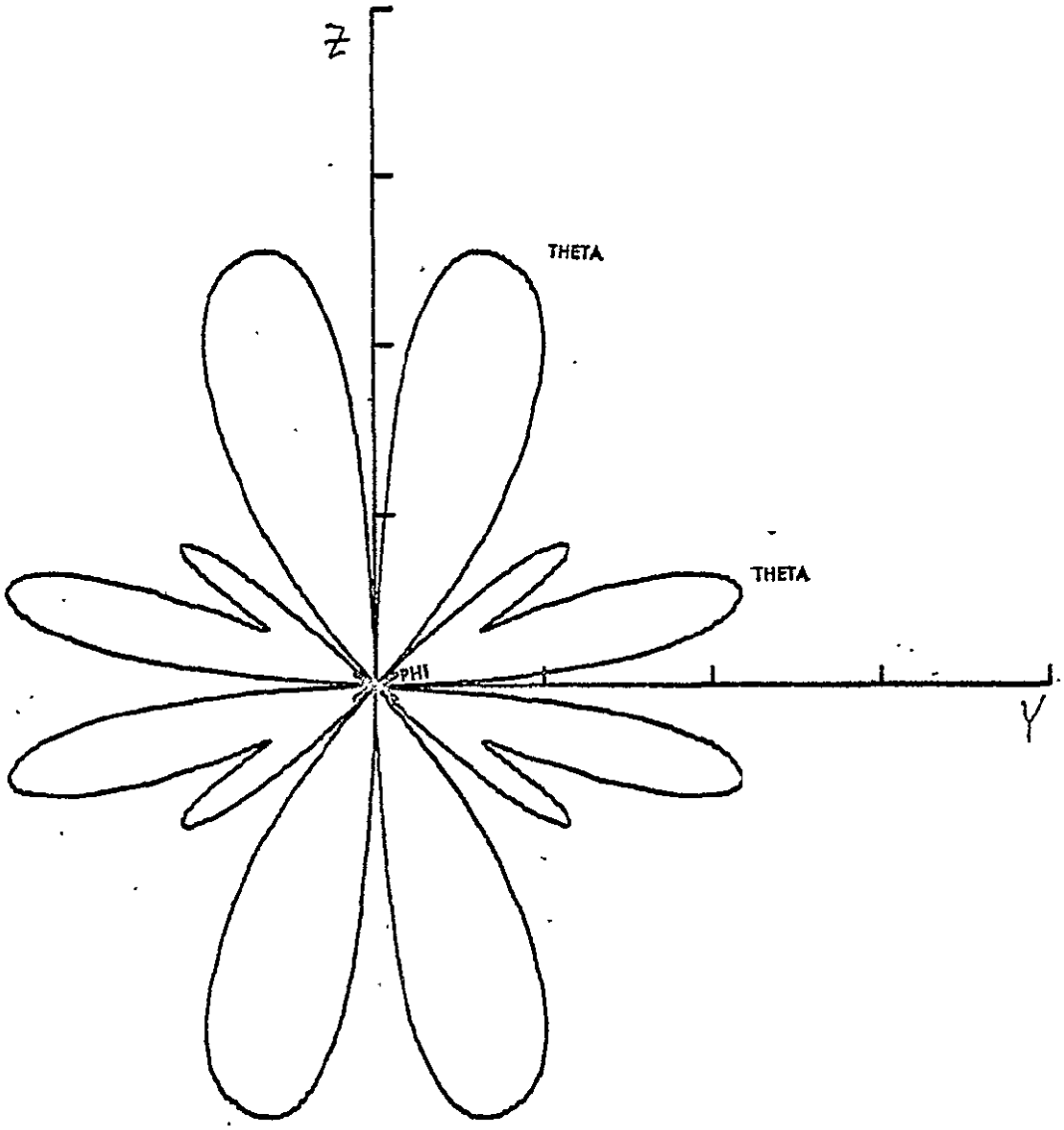

FIGURE B-176

FREQUENCY (MHZ) 3.93
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX + 2.9
DB MIN - 17.1

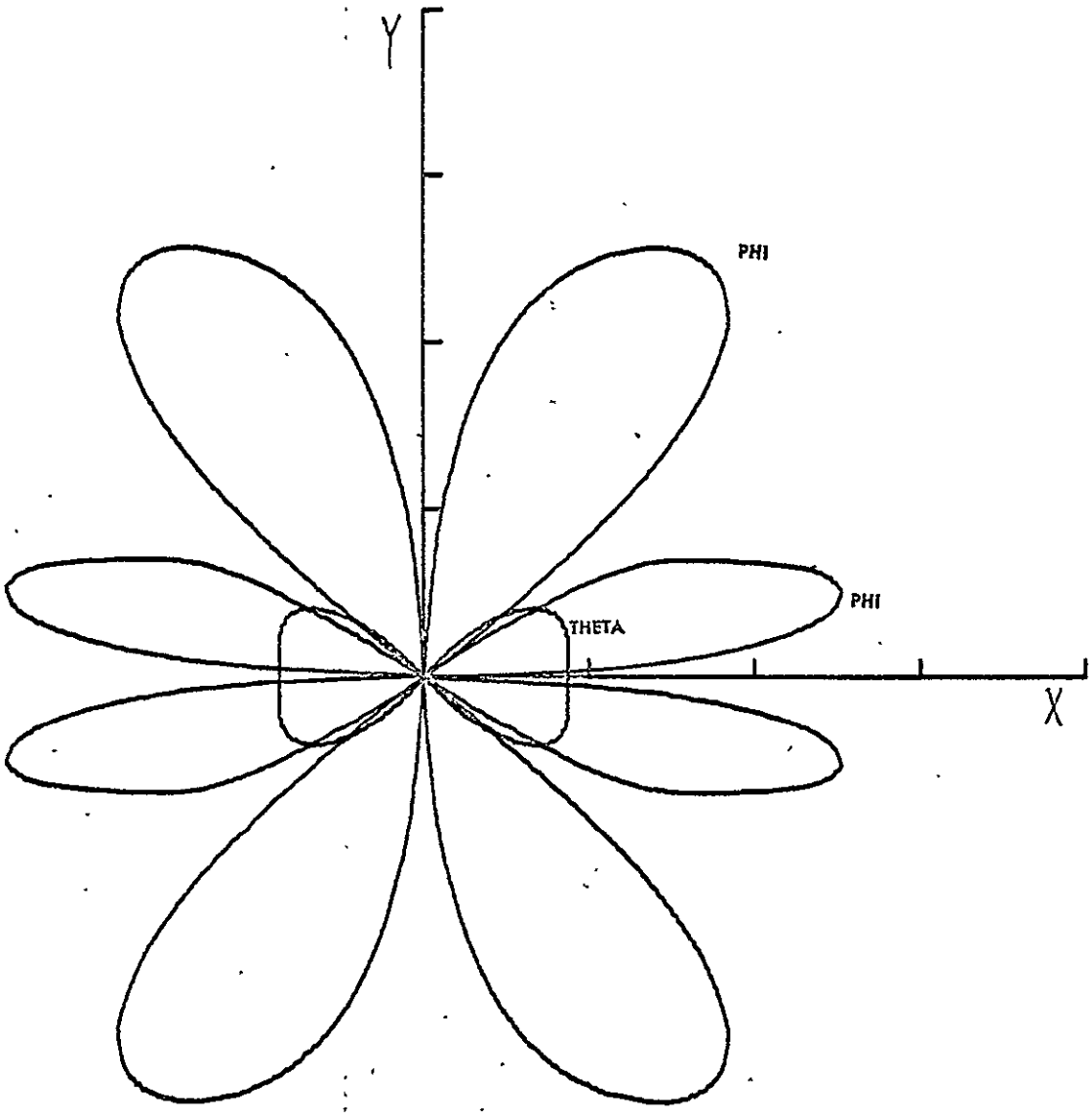

FIGURE B-177

FREQUENCY (MHZ) 3.93
Y-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX + 2.9
DB MIN - 17.1

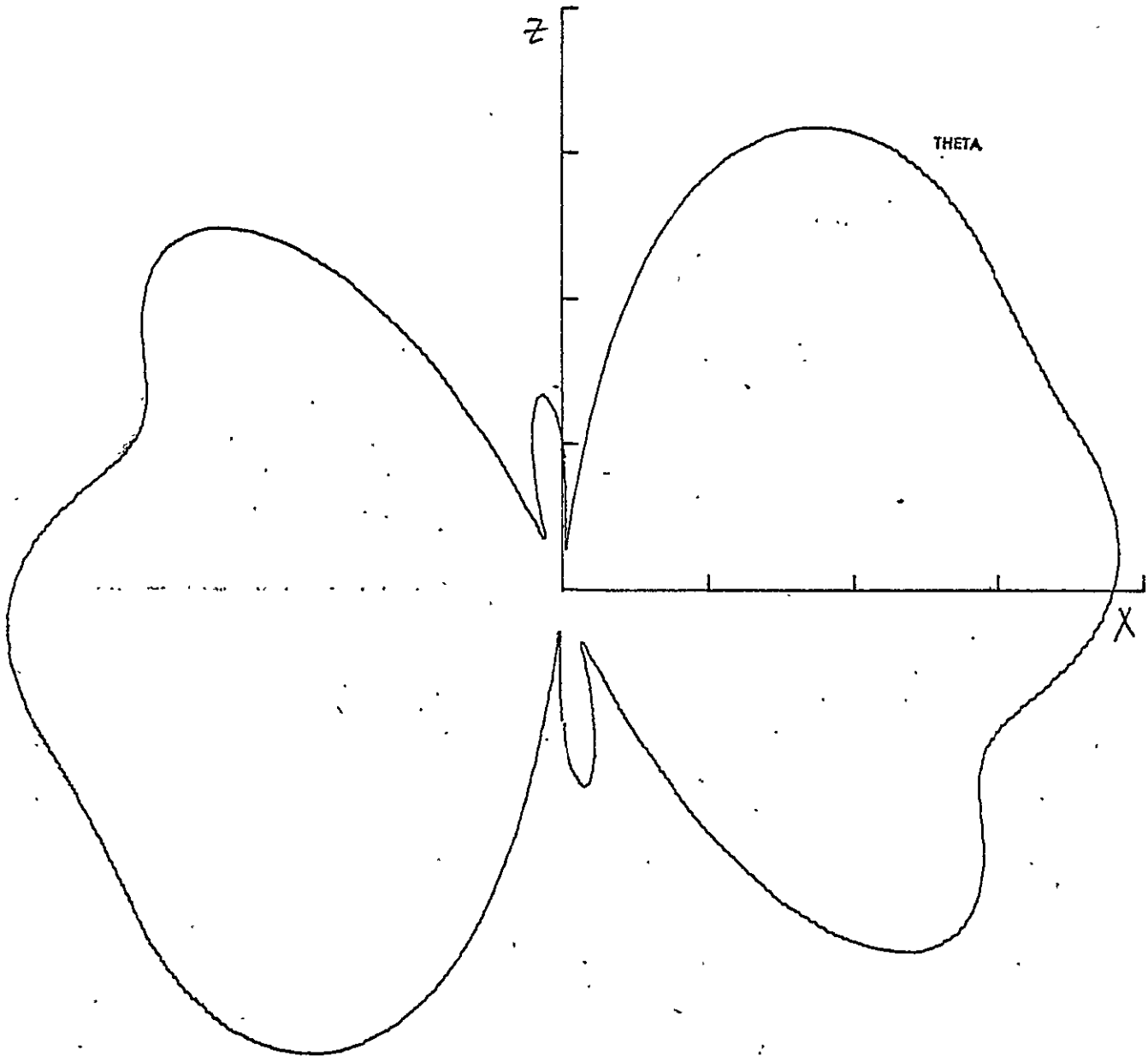

FIGURE B-178

FREQUENCY (MHZ) 4.70
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX + 1.6
DB MIN - 18.4

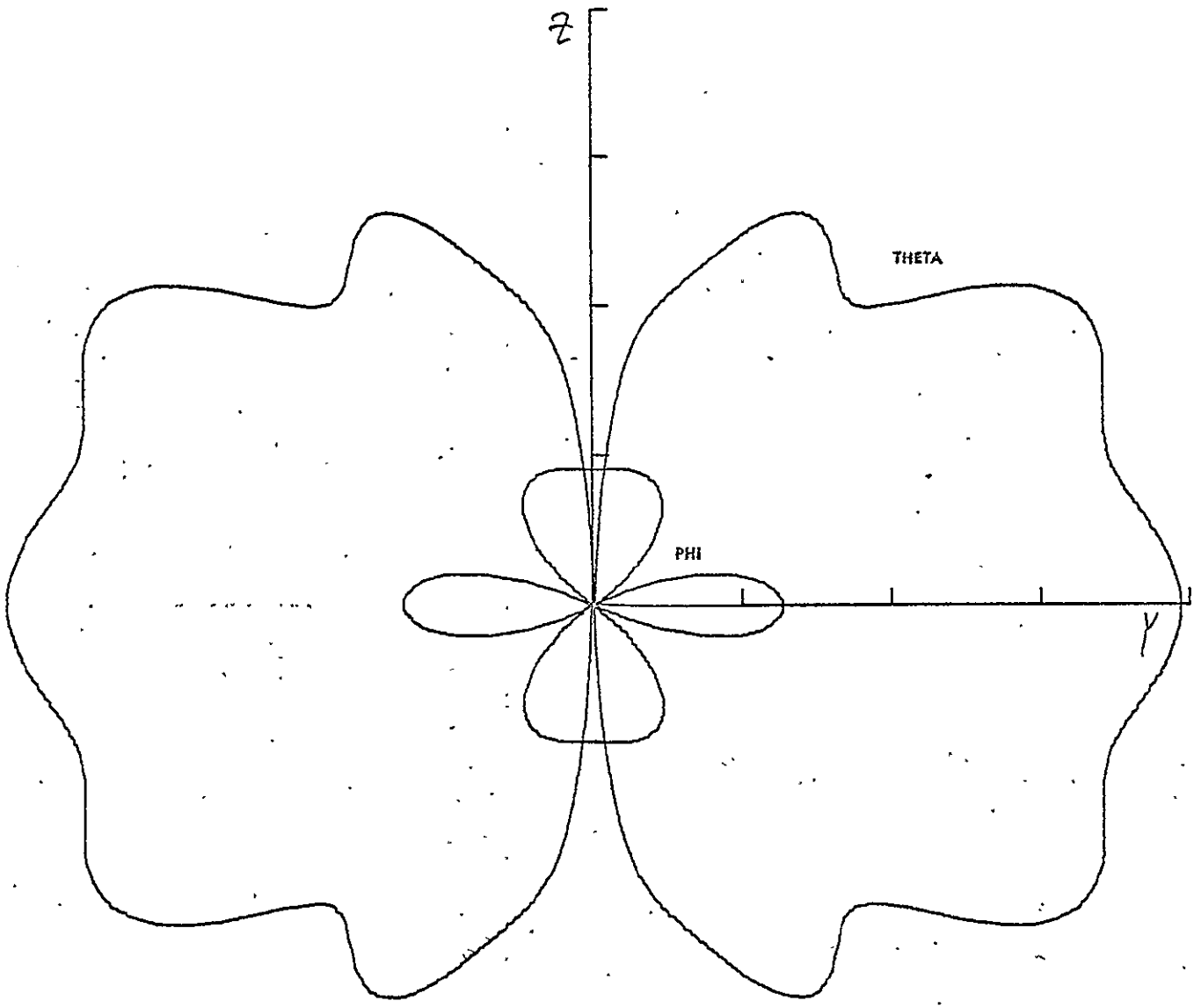

FIGURE B-179

FREQUENCY (MHZ) 4.70
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX + 1.6
DB MIN -18.4

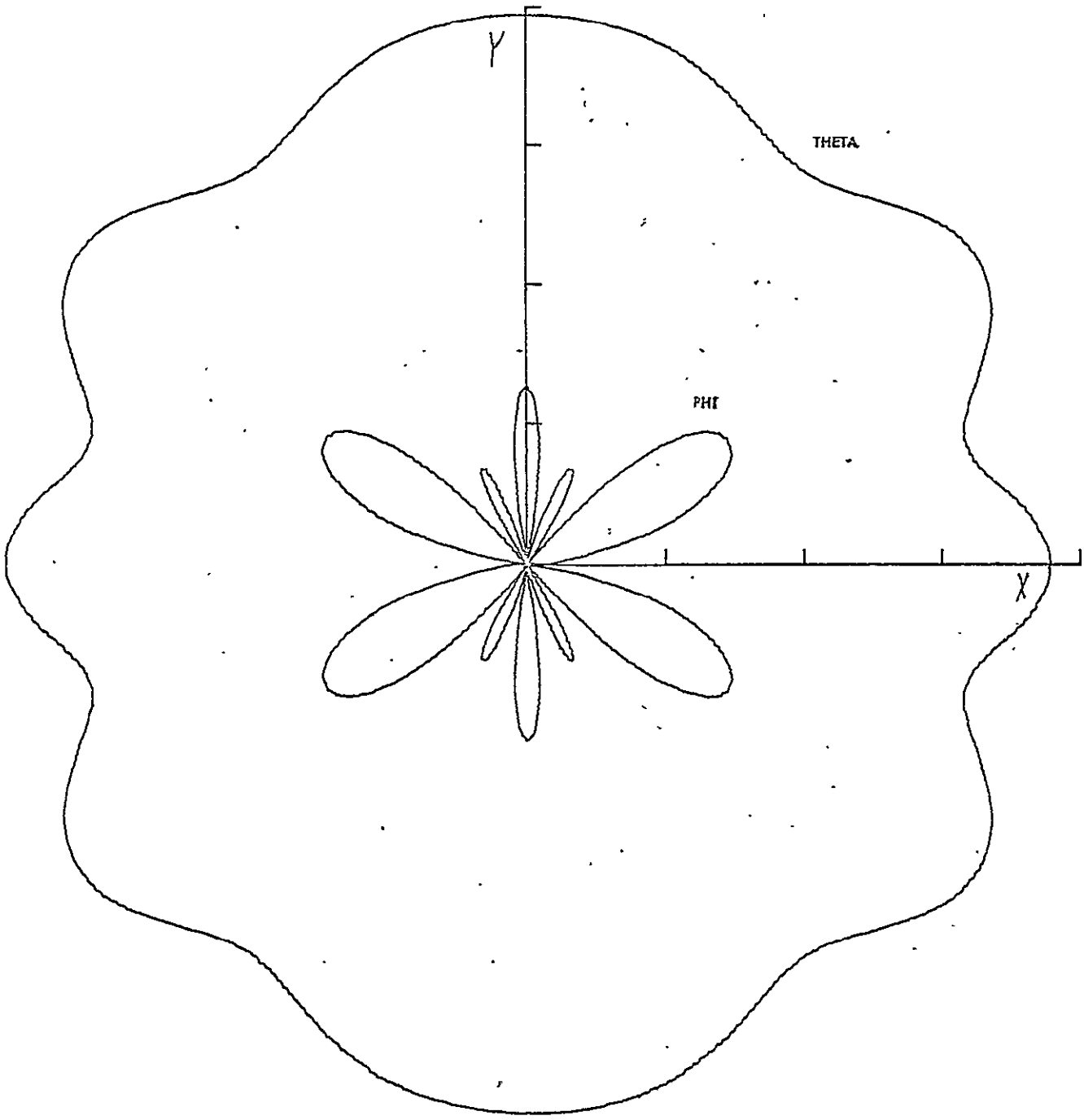

FIGURE B-180

FREQUENCY (MHZ) 4.70
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX + 1.6
DB MIN -18.4

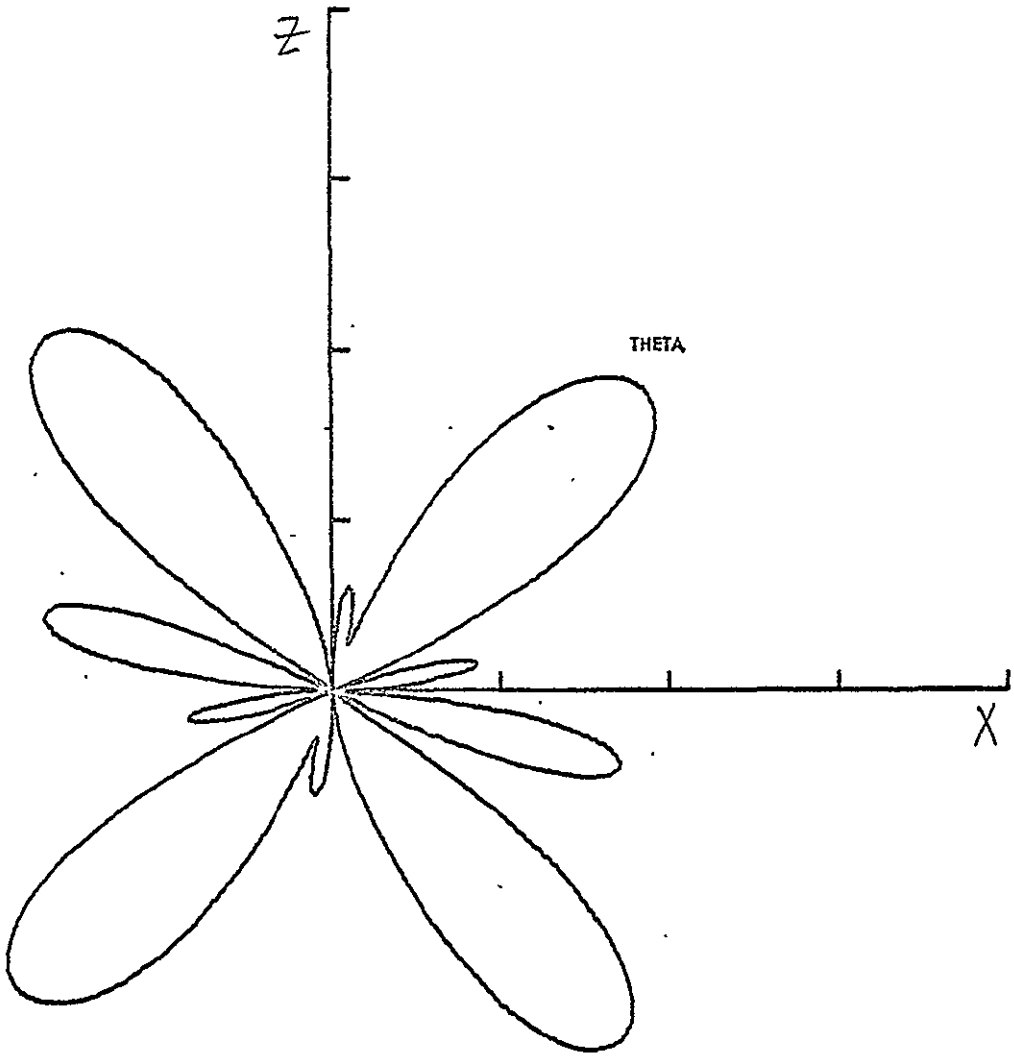

FIGURE B-181

FREQUENCY (MHZ) 4.70
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX + 1.6
DB MIN -18.4

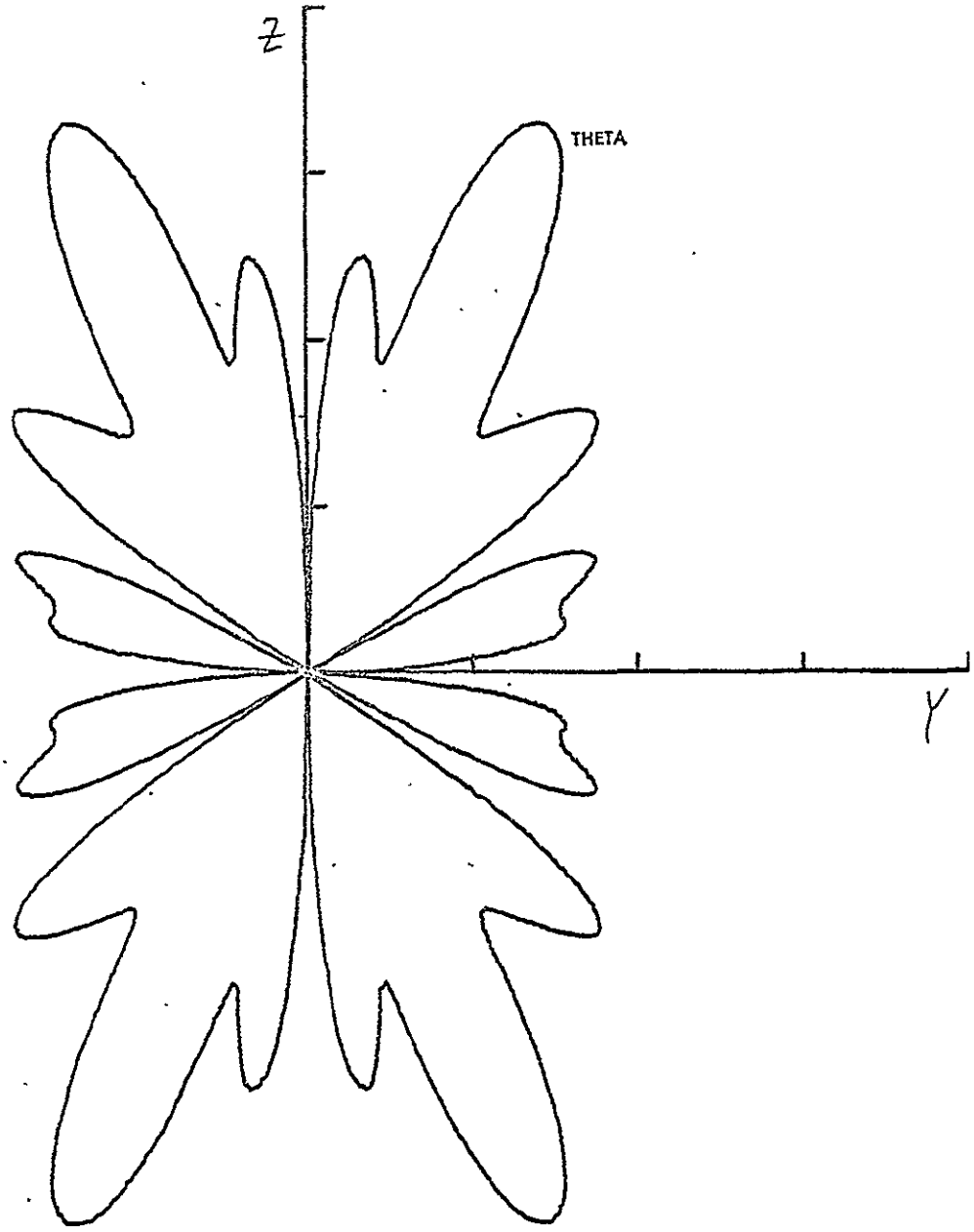

FIGURE B-182

FREQUENCY (MHZ) 4.70
V-ANT. LENGTH (FT) 450'
MODE UNBALANCED
DB MAX + 1.6
DB MIN -18.4

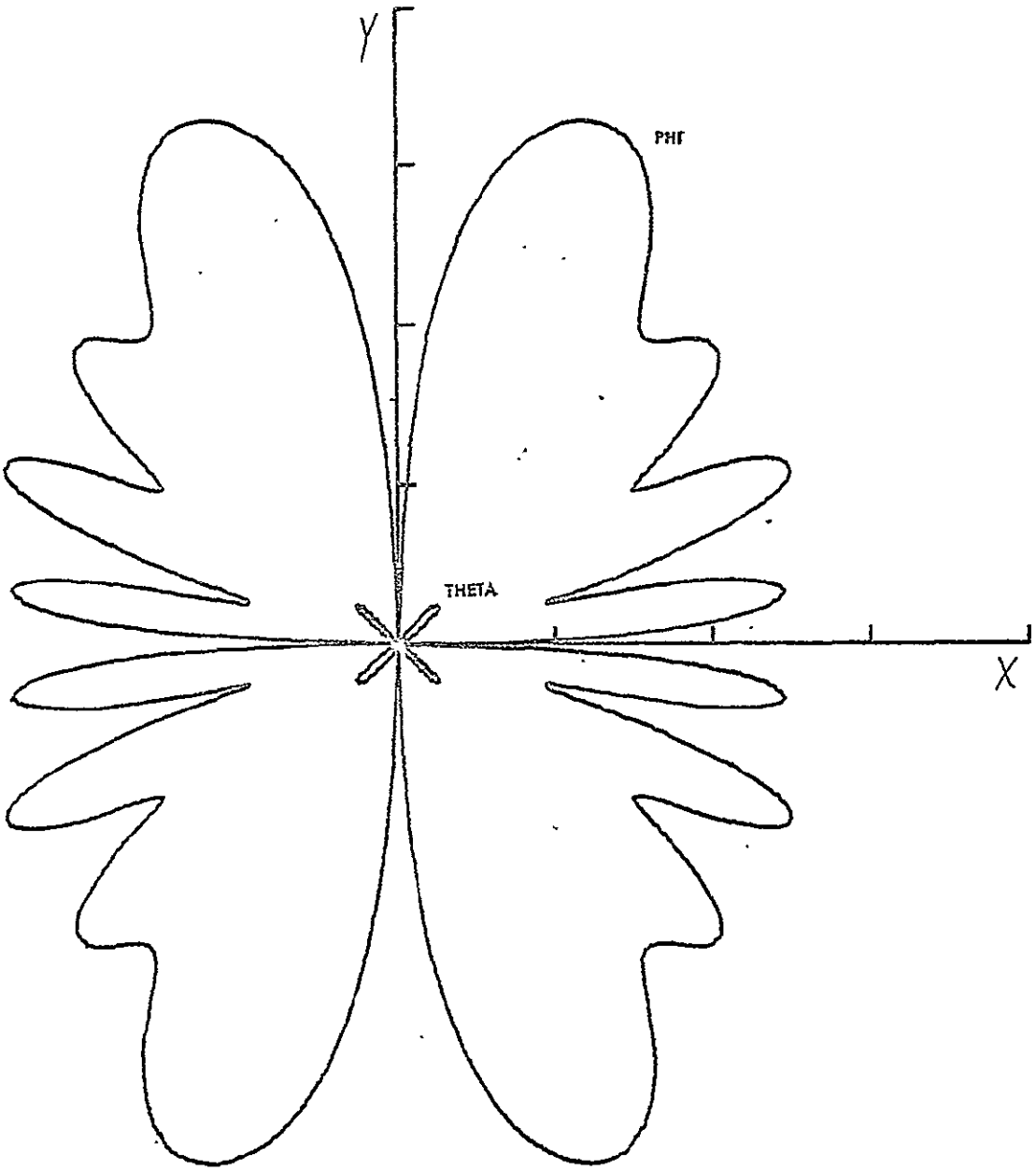

FIGURE B-183

FREQUENCY (MHZ) 4.70
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX + 1.6
DB MIN -18.4

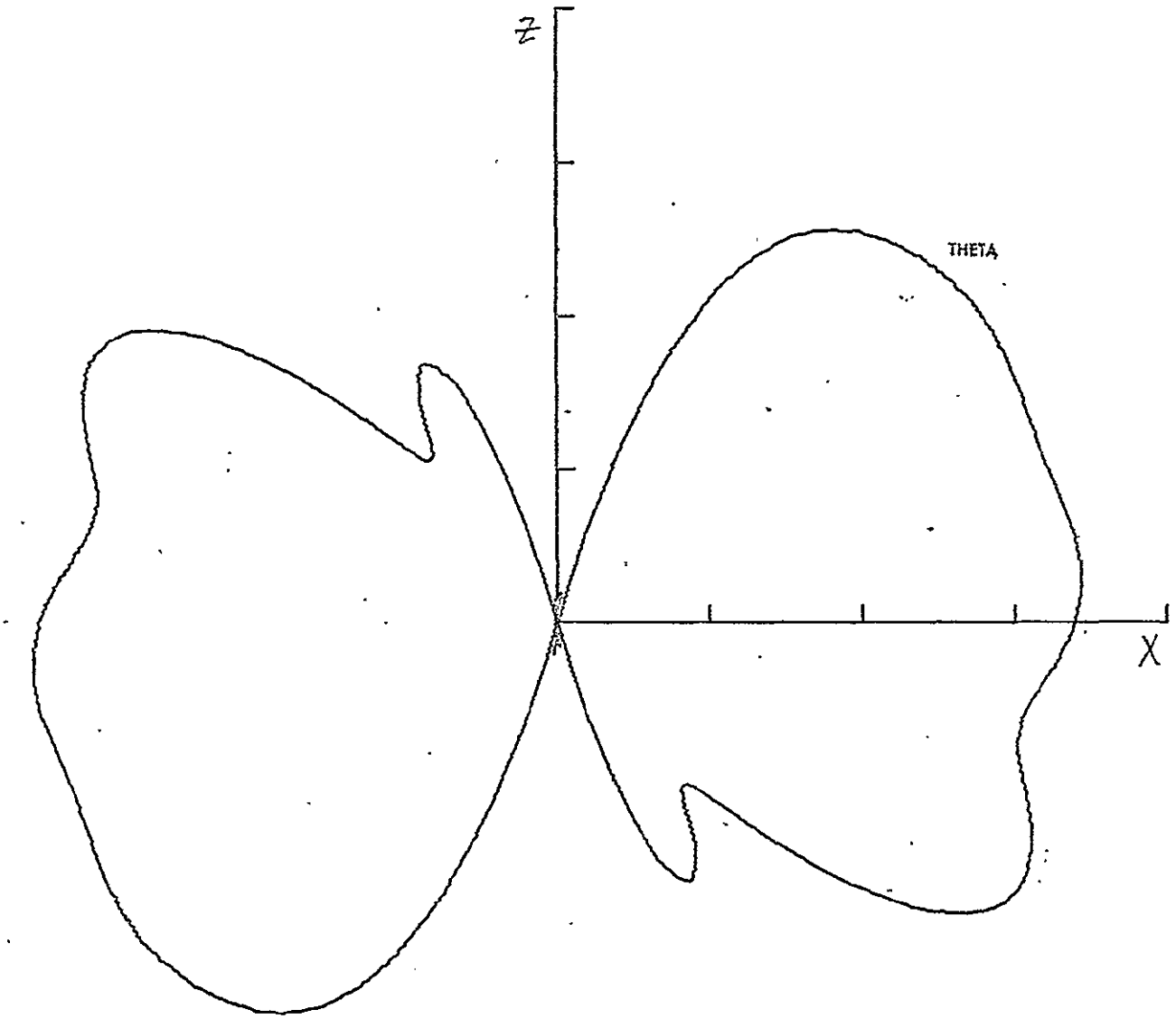

FIGURE B-184

FREQUENCY (MHZ) 6.55
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX +3.3
DB MIN -16.7

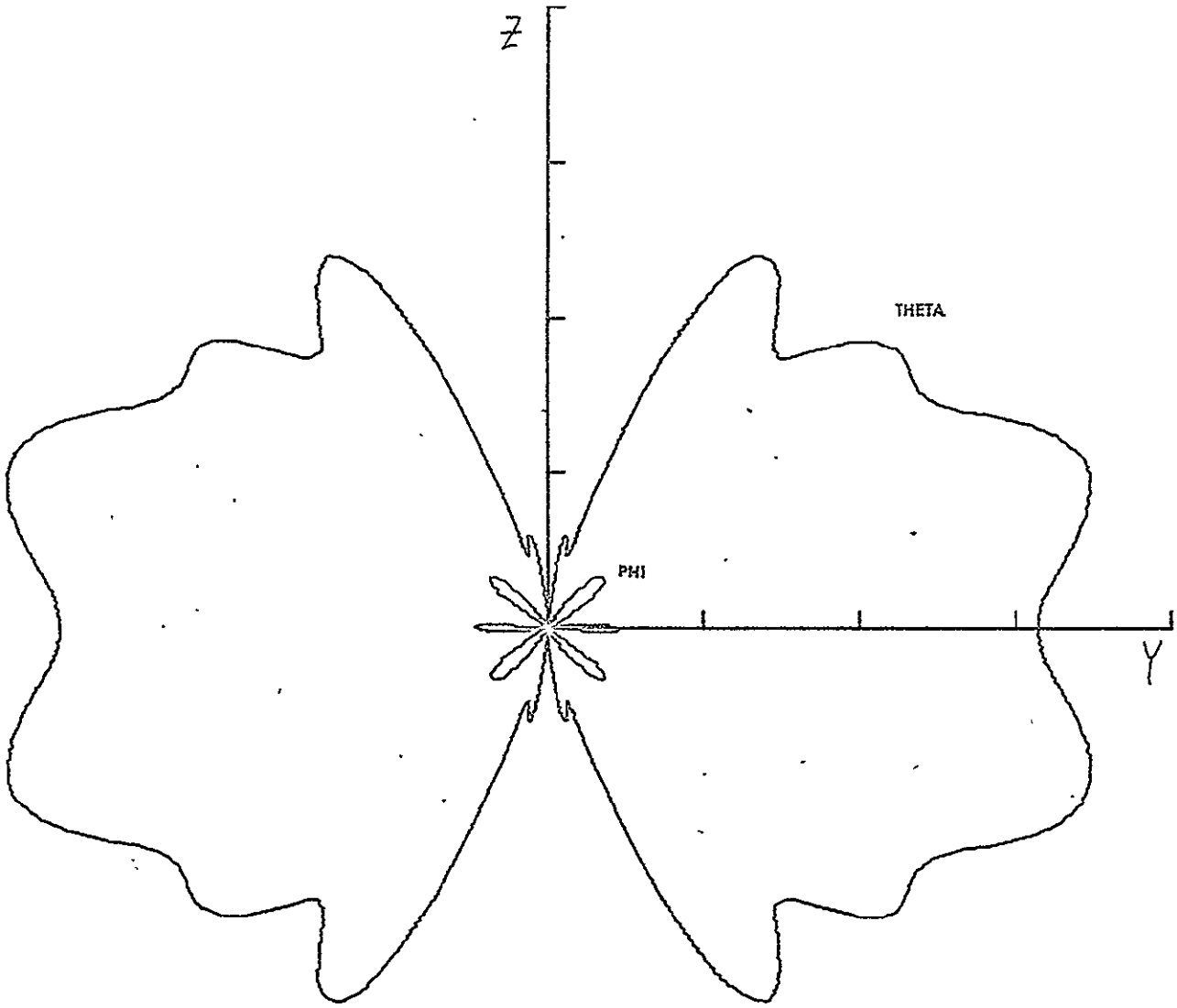

FIGURE B-185

FREQUENCY (MHZ) 6.55
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX + 3.3
DB MIN. -16.7

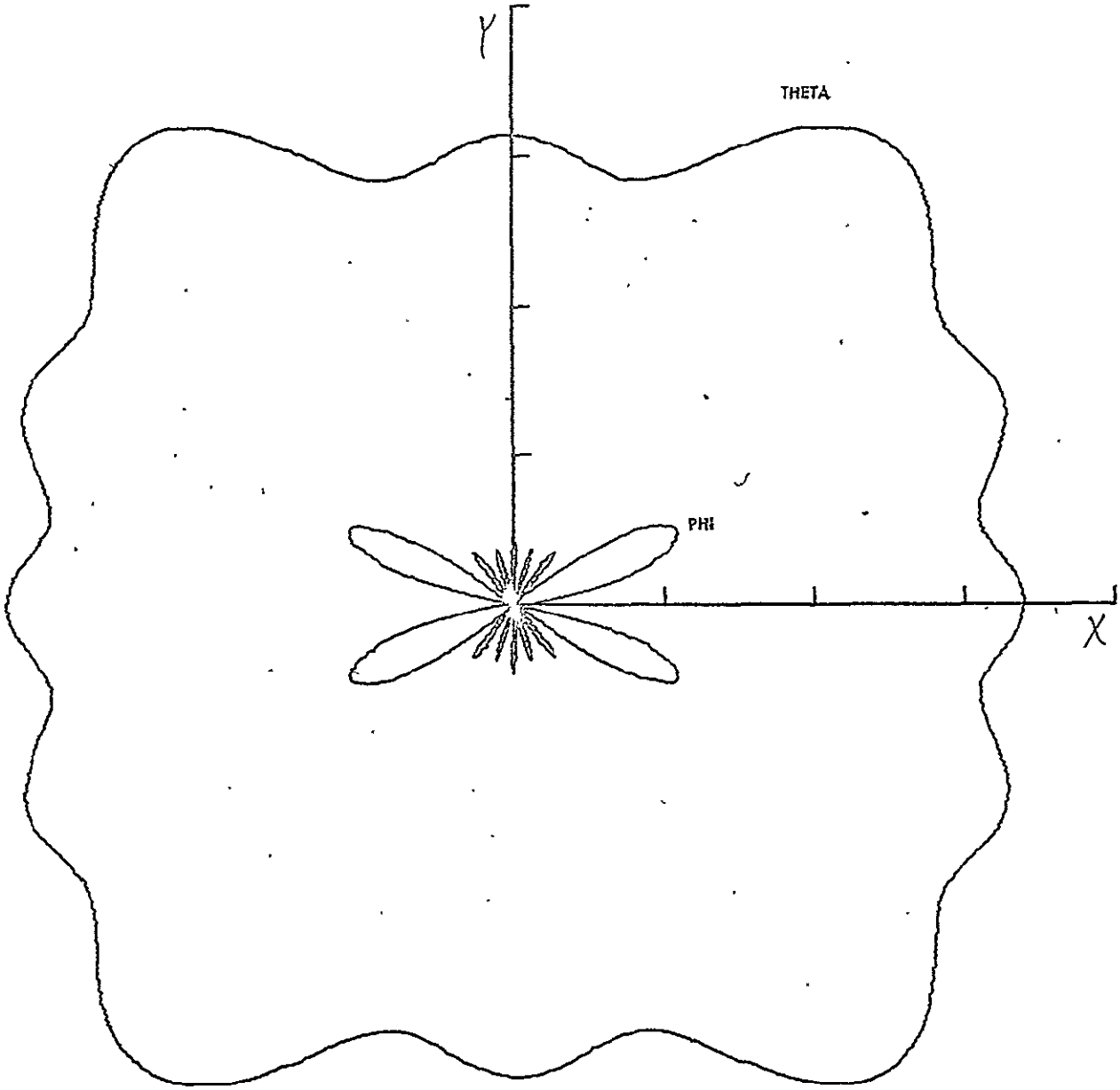

FIGURE B-186

FREQUENCY (MHZ) 6.55
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX + 3.3
DB MIN -16.7

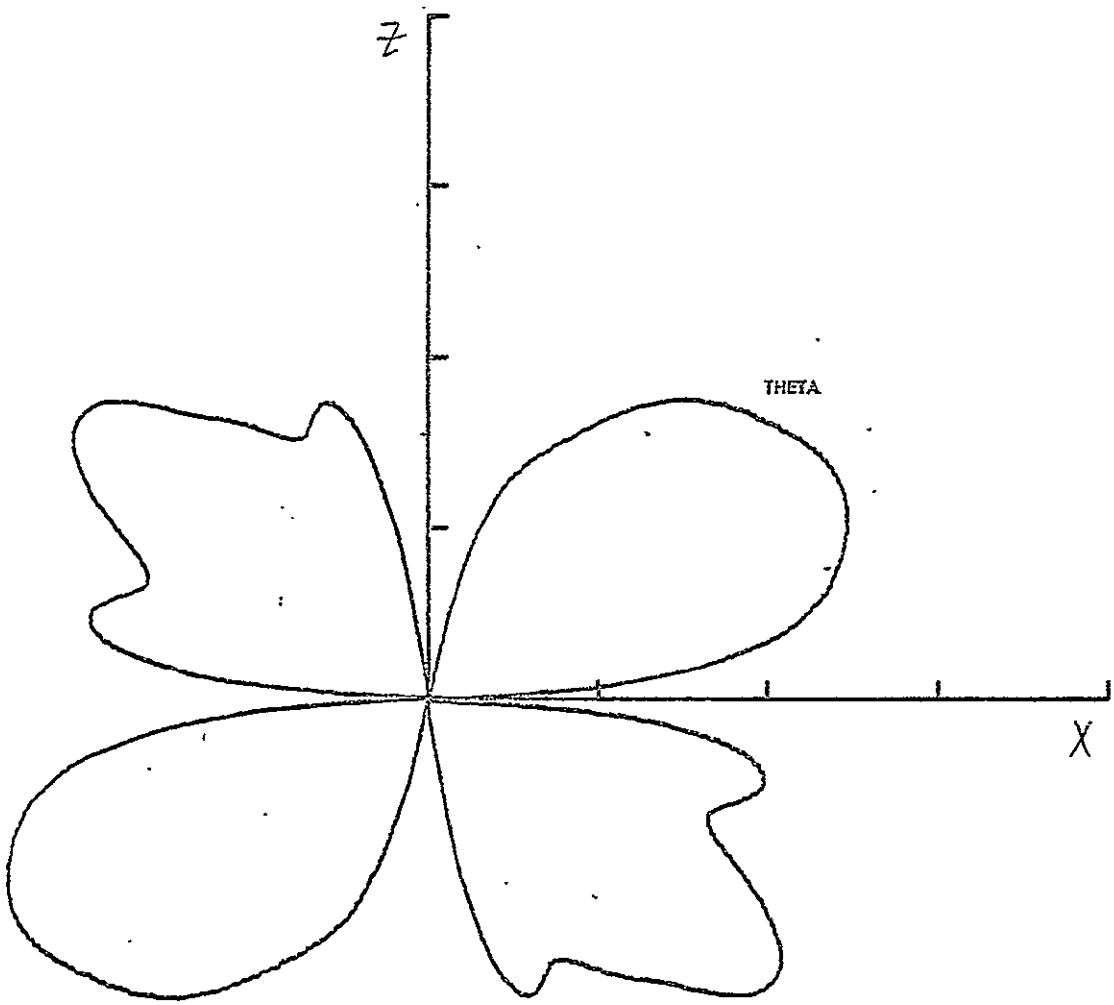

FIGURE B-187

FREQUENCY (MHZ) 6.55
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX + 3.3
DB MIN -16.7

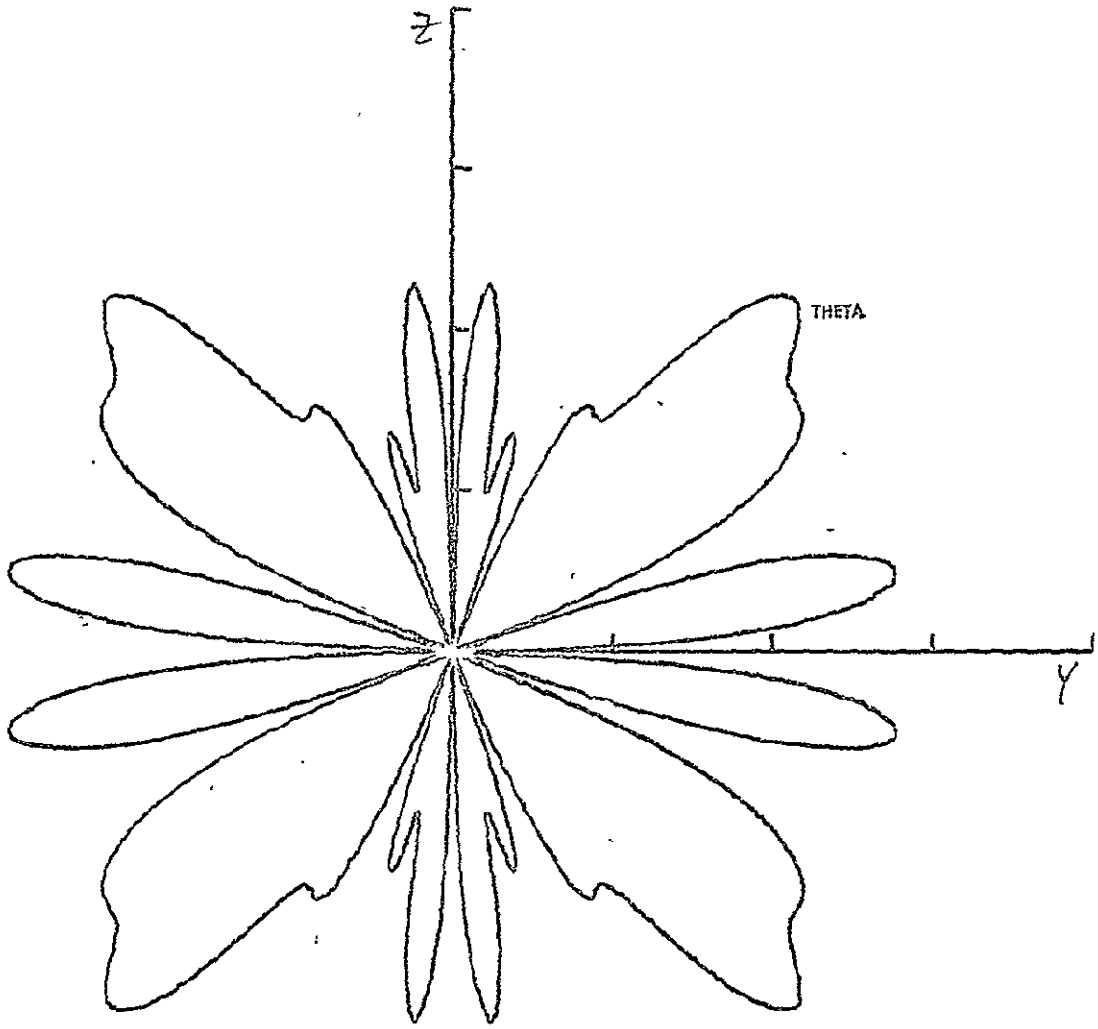

FIGURE B-188

FREQUENCY (MHZ) 6.55
Y-ANT. LENGTH (FT) 430
MODE UNBALANCED
DB MAX + 3.3
DB MIN -16.7

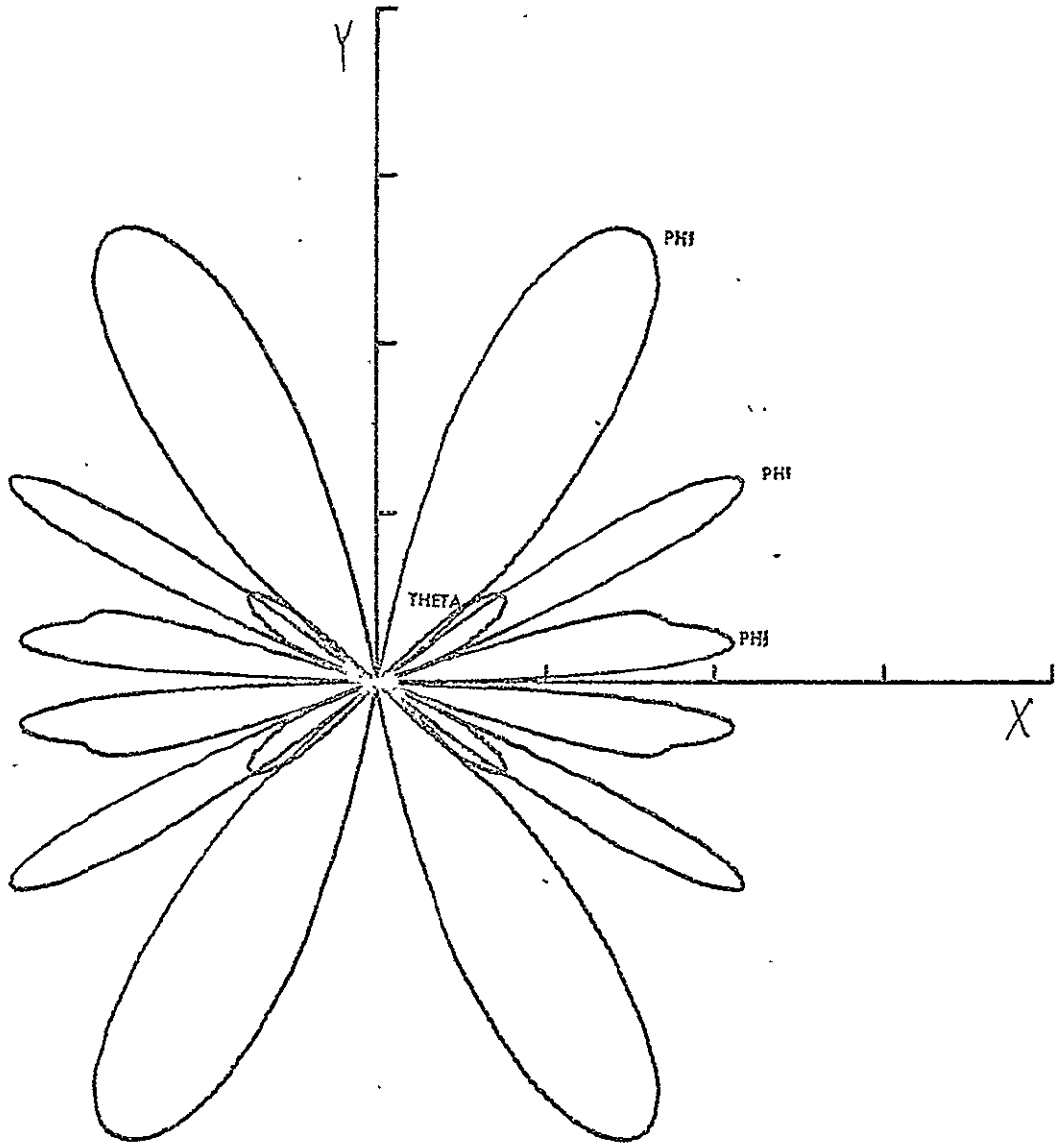

FIGURE B-189

FREQUENCY (MHZ) 6.55
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX + 3.3
DB MIN -16.7

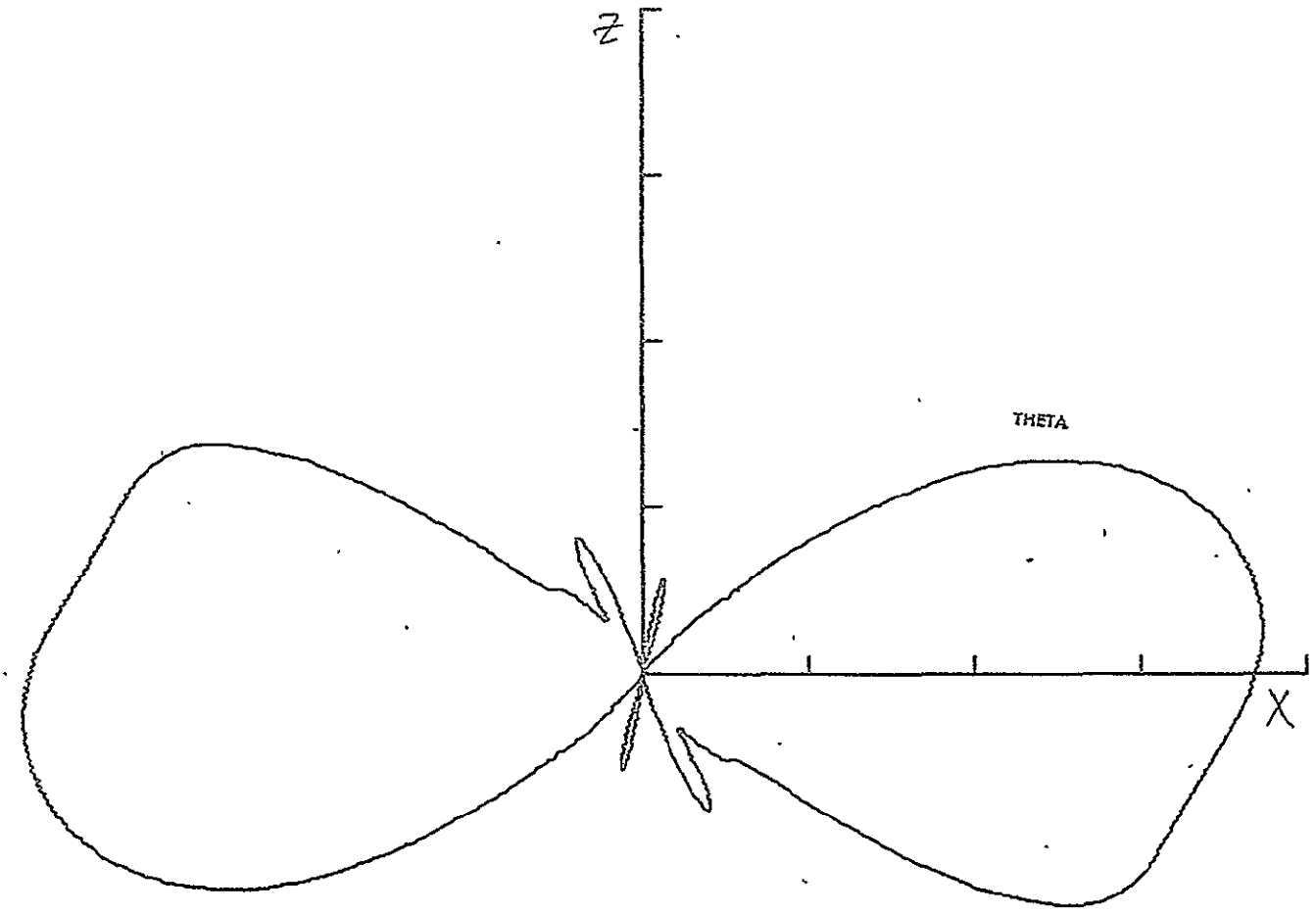

FIGURE B-190

FREQUENCY (MHZ) 9.18
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX + 4.9
DB MIN − 15.1

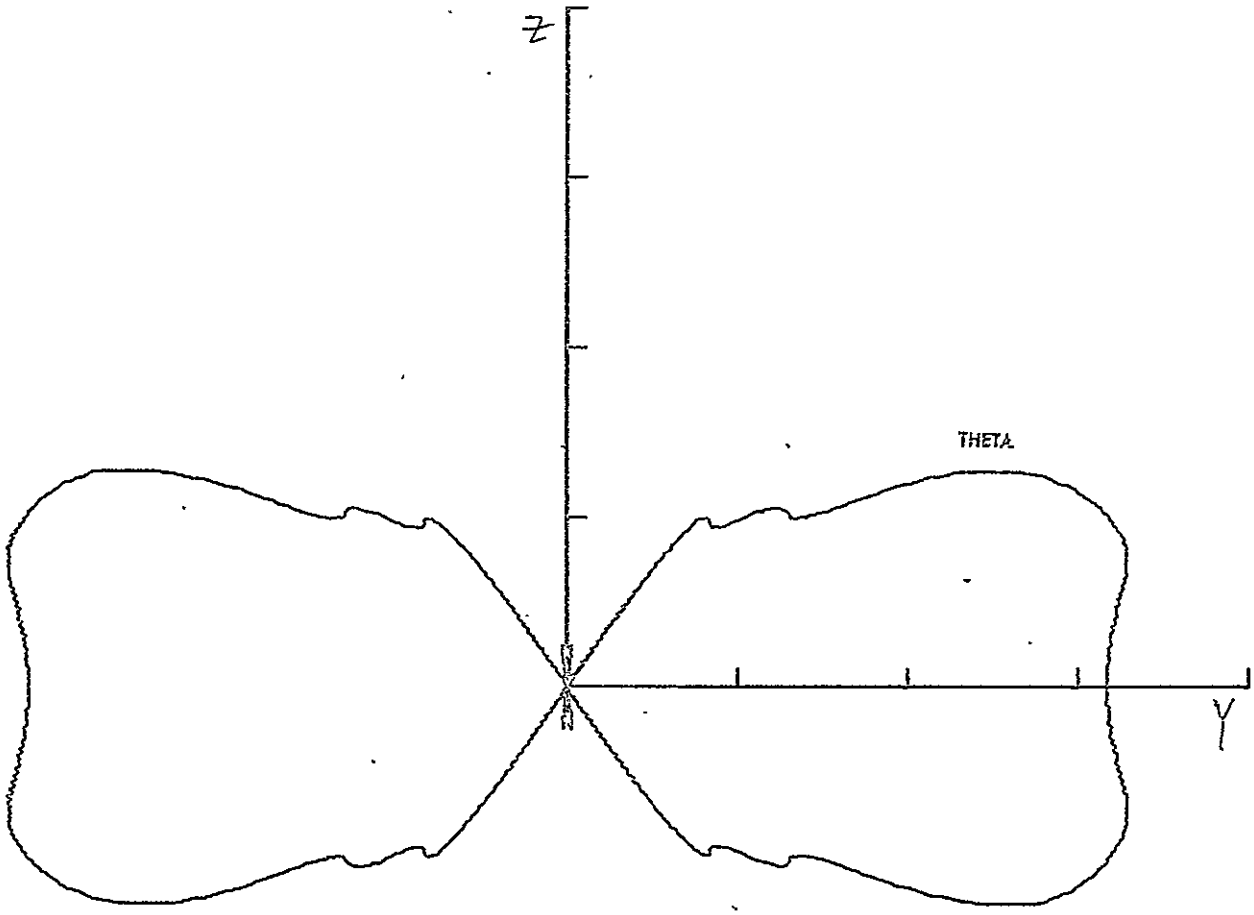

FIGURE B-191

FREQUENCY (MHZ) 9.18
V-ANT. LENGTH (FT) 450
MODE BALANCED
DB MAX + 4.9
DB MIN - 15.1

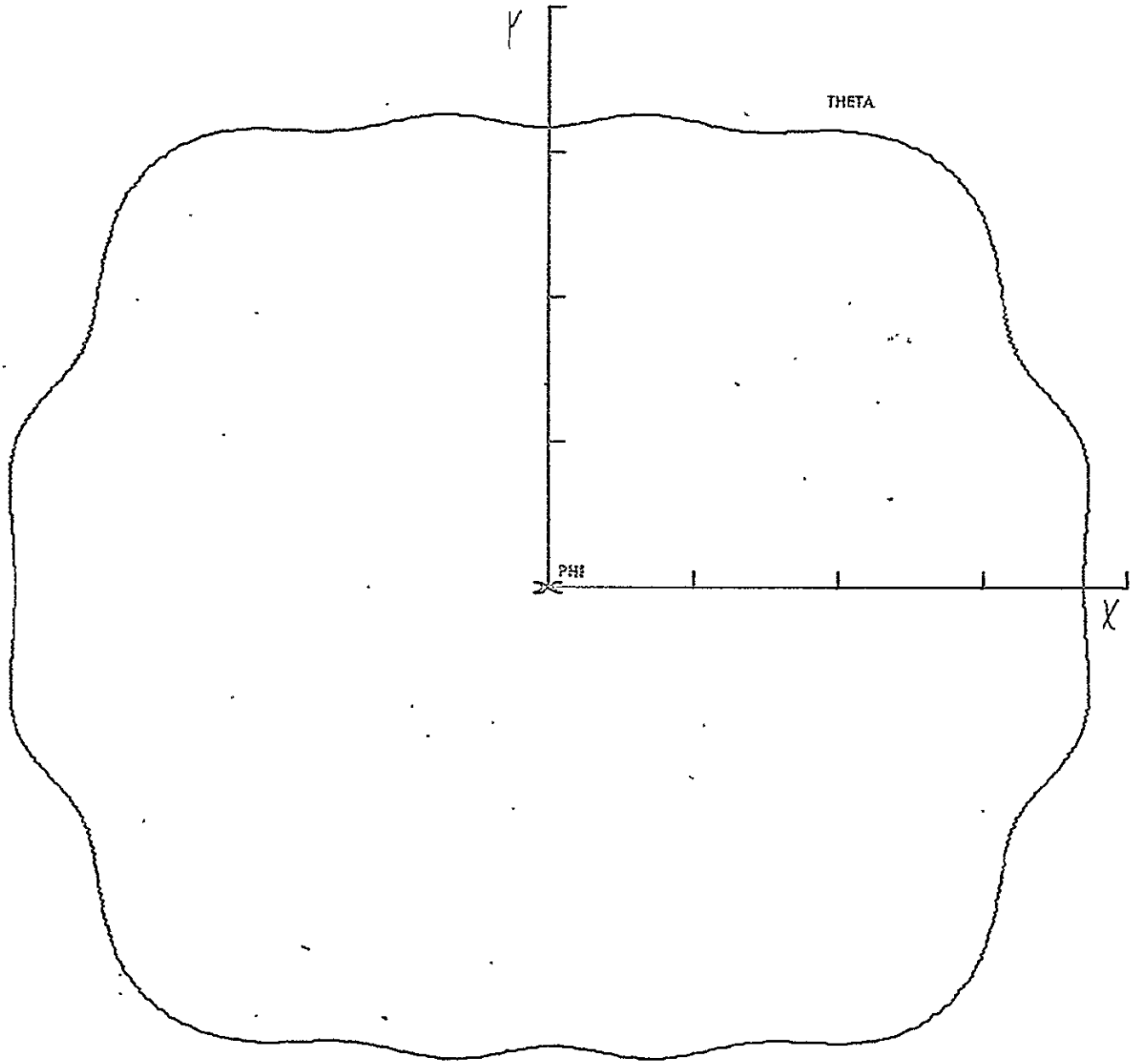

FIGURE B-192

FREQUENCY (MHZ) 9.18
VANT. LENGTH (FT) 450
MODE BALANCED
DB MAX +4.9
DB MIN -15.1

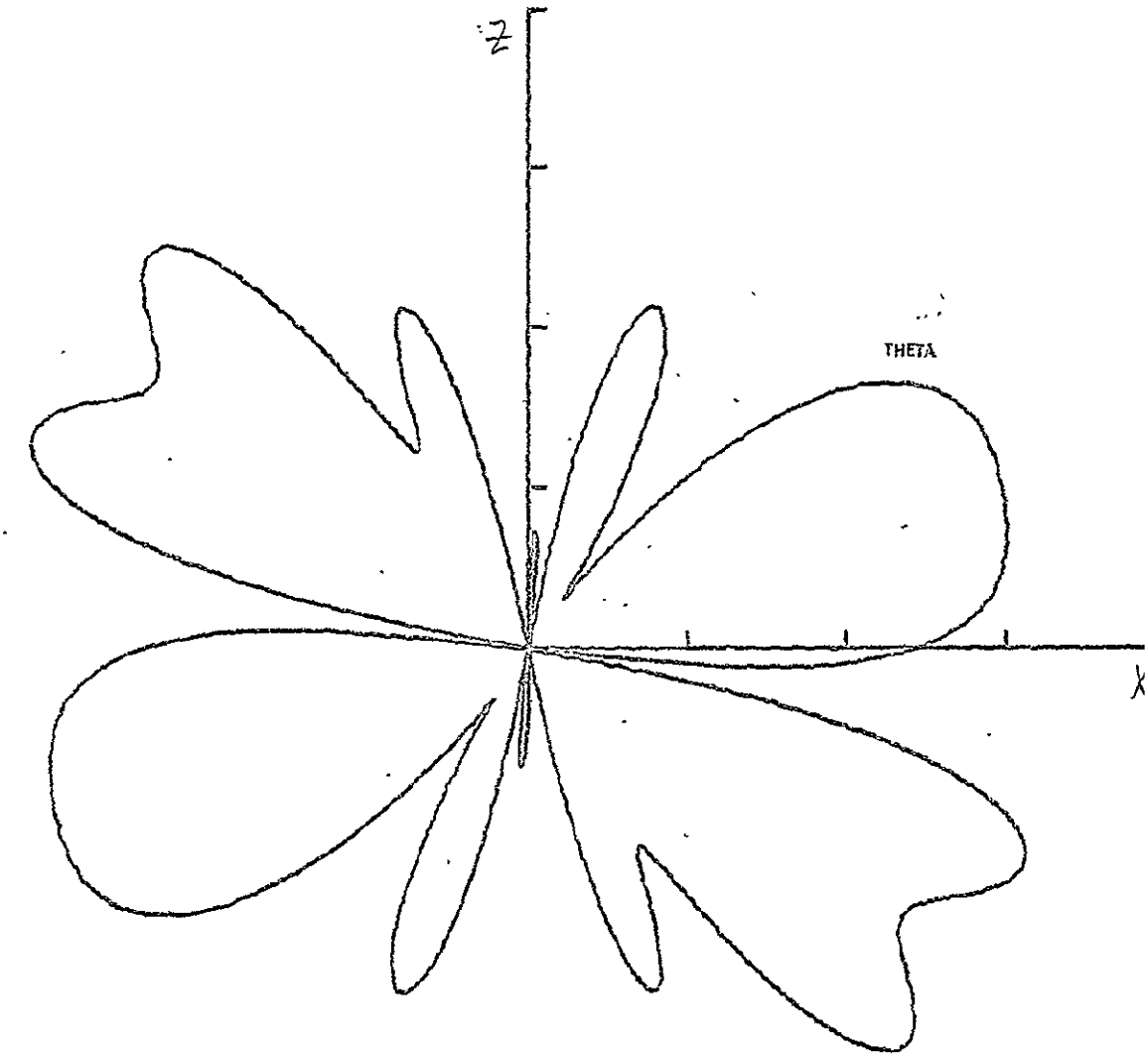

FIGURE B-193

FREQUENCY (MHZ) 9.18
V-ANT. LENGTH (FT) 450'
MODE UNBALANCED
DB MAX + 4.9
DB MIN -15.1

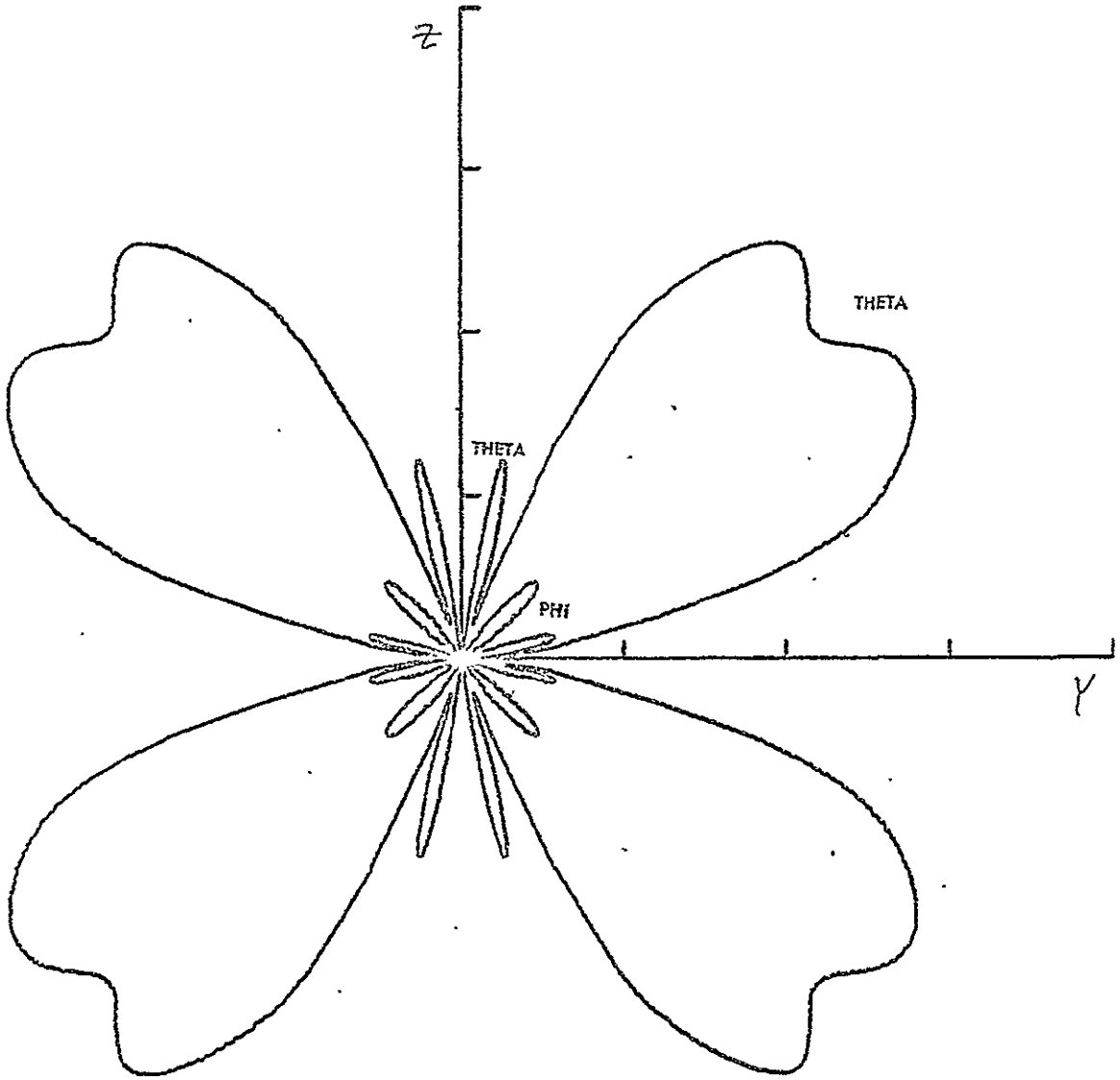

FIGURE B-194

FREQUENCY (MHZ) 9.18
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX + 4.9
DB MIN -15.1

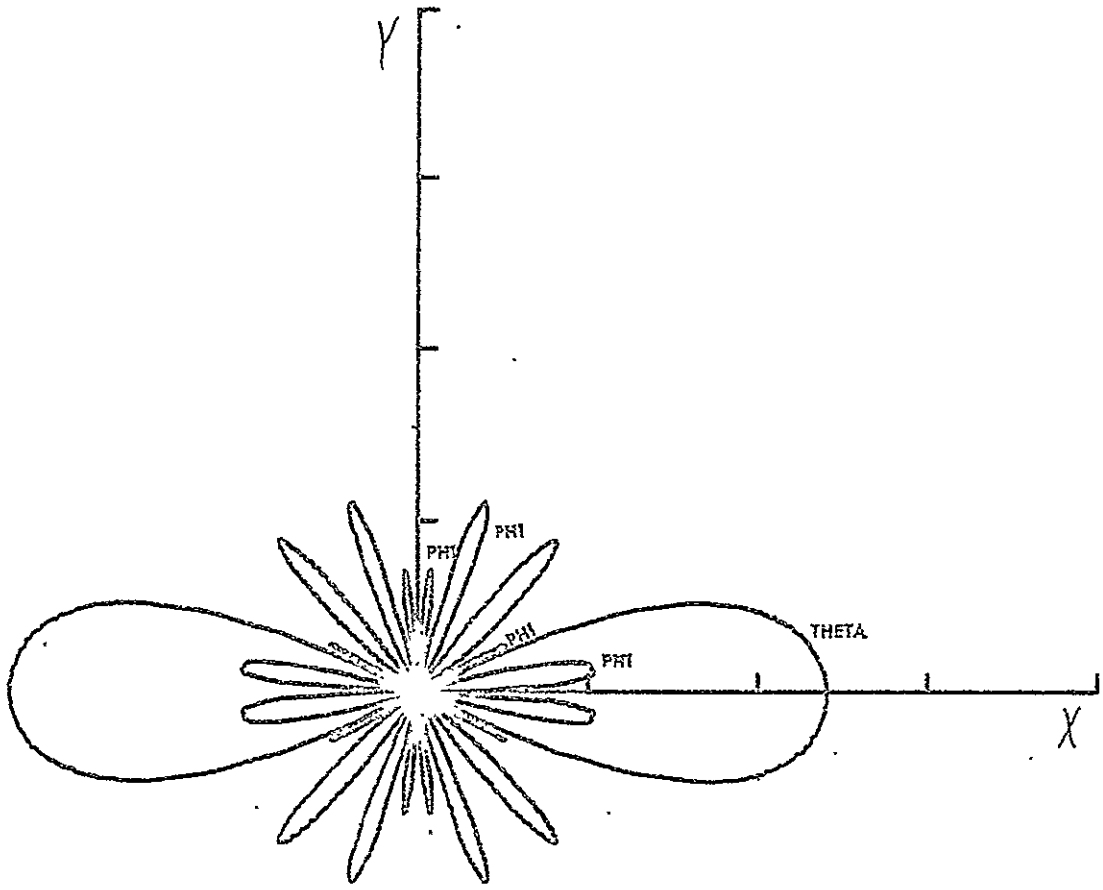

FIGURE B-195

FREQUENCY (MHZ) 9.18
V-ANT. LENGTH (FT) 450
MODE UNBALANCED
DB MAX + 4.9
DB MIN - 15.1

APPENDIX C

CURRENT DISTRIBUTIONS FOR DIPOLE ALONE ON SATELLITE

See Appendix A for discussion

NOTE: Wires 1 through 6 represent the dipole, and wire 7 the spacecraft capacitance.

ANTENNA/SCATTERING PROGRAM WIRA

****

TCI.2236 NASA SATELLITE ANT. ALONE INTERPOLATION SCHEMF 1

NUMBER OF WIRES 7
THE X-Z PLANE IS A MAGNETIC PLANE
WIRE CONDUCTIVITY INFINITE

WIRE COORDINATES IN FEET AND WIRE RADII IN INCHES

WIRE NO			X1	Y1	Z1	RAD1	X2	Y2	Z2	RAD2	INTERVALS
1	GAP	1	-0.0000	-0.0000	-0.0000	.250000	-0.0000	-0.0000	5.0000	.250000	1
2			-0.0000	-0.0000	5.0000	.250000	-0.0000	-0.0000	15.0000	.250000	1
3			-0.0000	-0.0000	15.0000	.250000	-0.0000	-0.0000	61.5000	.250000	3
4	GAP	2	-0.0000	-0.0000	-0.0000	.250000	-0.0000	-0.0000	-5.0000	.250000	1
5			-0.0000	-0.0000	-5.0000	.250000	-0.0000	-0.0000	-15.0000	.250000	1
6			-0.0000	-0.0000	-15.0000	.250000	-0.0000	-0.0000	-61.5000	.250000	3
7	GAP	3	-0.0000	-0.0000	-0.0000	.830000	-0.0000	3.4500	-0.0000	.830000	1

FREQUENCY = 2.2000 MC

NO GROUND PRESENT

MAXIMUM RELATIVE ASYMMETRY IN THE ANTENNA ADMITTANCE MATRIX IS .0 PER CENT FOR GAPS 2 AND 1

EXCITATION MODE 1

GAP SOURCES

GAP	EMF VOLT	EMF DEGREES	OHM	MICRO HENRY	PICO FARAD	
1	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES
2	1000.0000	180.00	-0.0000	-0.0000	INFINITY	SERIES

NONRADIATING NETWORKS CONNECTING THE GAPS

NET NO	NETTYPE	GAP CONNECTIONS	PARAM1	PARAM2	PARAM3	PARAM4
1	IMP	1- 0	*000000.0000	-0.0000	-0.0000	-0.0000
2	IMP	2- 0	*000000.0000	-0.0000	-0.0000	-0.0000

WIRE NO	INT NO	COORDINATES X WAVELENGTHS	COORDINATES Y WAVELENGTHS	COORDINATES Z WAVELENGTHS	CURRENT DISTRIBUTION AMPLITUDE			CURRENT DISTRIBUTION PHASE			NORMAL ELECTRIC FIELD * RADIUS VOLTS	NORMAL ELECTRIC FIELD * RADIUS DEG
		0.0000	0.0000	-.0000	GAP 1			GAP 1			241.007	.0
1	1	0.0000	0.0000	.0056	2.6893	2.5571	2.4426	88.7	88.6	88.6	210.883	-.1
2	2	0.0000	0.0000	.0224	2.4607	2.2672	2.0736	88.6	88.5	88.4	165.528	-.5
3	3	0.0000	0.0000	.0509	2.0803	1.7755	1.4556	88.4	88.3	88.2	172.538	-1.0
3	4	0.0000	0.0000	.0855	1.4601	1.1243	.7722	88.2	88.1	88.0	189.967	-1.6
3	5	0.0000	0.0000	.1201	.7842	.4079	.0000	88.0	87.9	-94.9	216.569	-2.0
		0.0000	0.0000	.0000	GAP 2			GAP 2			241.007	-180.0
4	6	0.0000	0.0000	-.0056	2.6893	2.5571	2.4426	-91.3	-91.4	-91.4	210.883	179.9
5	7	0.0000	0.0000	-.0224	2.4607	2.2672	2.0736	-91.4	-91.5	-91.6	165.528	179.5
6	8	0.0000	0.0000	-.0509	2.0803	1.7755	1.4556	-91.6	-91.7	-91.8	172.538	179.0
6	9	0.0000	0.0000	-.0855	1.4601	1.1243	.7722	-91.8	-91.9	-92.0	189.967	178.4
6	10	0.0000	0.0000	-.1201	.7842	.4079	.0000	-92.0	-92.1	85.1	216.569	178.0
		0.0000	-.0000	0.0000	GAP 3			GAP 3			.000	84.8
7	11	0.0000	.0039	0.0000	.0000	.0000	.0000	177.4	178.8	-78.0	.000	87.4

IMPEDANCE DATA

GAP NO	INPUT RESIST. OHMS	INPUT REACT. OHMS	INPUT CONDUCT. MHOS	INPUT SUSCEPT. MHOS	LOAD RESIST. OHMS	LOAD REACT. OHMS	GAP RESIST. OHMS	GAP REACT. OHMS	GAP VOLTAGE VOLT	GAP VOLTAGE DEGREES
1	8.358	-371.756	.000060	.002689	0.000	0.000	8.358	-371.756	1000.000	0.0
2	8.358	-371.756	.000060	.002689	0.000	0.000	8.358	-371.756	1000.000	-180.0

INPUT POWER = 120.896 WATTS
RADIATED POWER = 120.895 WATTS
WIRE LOSS = .000 WATTS
NETWORK LOSS = .001 WATTS
RADIATION EFFICIENCY = 100.00 PER CENT

EXCITATION MODE 2

GAP SOURCES

GAP	EMF VOLT	EMF DEGREES	OHM	MICRO HENRY	PICO FARAD	
1	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES
2	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES

NETWORKS UNCHANGED

WIRE NO	INT NO	COORDINATES X WAVELENGTHS	Y WAVELENGTHS	Z WAVELENGTHS	CURRENT DISTRIBUTION AMPLITUDE			PHASE			NORMAL ELECTRIC FIELD * RADIUS	
					AMP	AMP	AMP	DEG	DEG	DEG	VOLTS	DEG
		0.0000	0.0000	-.0000	GAP 1			GAP 1			121.415	.0
1	1	0.0000	0.0000	.0056	.2090	.1498	.1142	90.0	90.0	90.0	81.062	.0
2	2	0.0000	0.0000	.0224	.1364	.1140	.0975	90.0	90.0	90.0	16.653	.0
3	3	0.0000	0.0000	.0509	.1017	.0835	.0666	90.0	90.0	90.0	9.699	.0
3	4	0.0000	0.0000	.0855	.0675	.0512	.0347	90.0	90.0	90.0	9.060	-.0
3	5	0.0000	0.0000	.1201	.0354	.0183	.0000	90.0	90.0	-90.2	9.775	-.0
		0.0000	0.0000	.0000	GAP 2			GAP 2			121.415	.0
4	6	0.0000	0.0000	-.0056	.2090	.1498	.1142	90.0	90.0	90.0	81.062	.0
5	7	0.0000	0.0000	-.0224	.1364	.1140	.0975	90.0	90.0	90.0	16.653	.0
6	8	0.0000	0.0000	-.0509	.1017	.0835	.0666	90.0	90.0	90.0	9.699	.0
6	9	0.0000	0.0000	-.0855	.0675	.0512	.0347	90.0	90.0	90.0	9.060	-.0
6	10	0.0000	0.0000	-.1201	.0354	.0183	.0000	90.0	90.0	-90.2	9.775	-.0
		0.0000	-.0000	0.0000	GAP 3			GAP 3			261.961	180.0
7	11	0.0000	.0039	0.0000	.2090	.1039	.0000	-90.0	-90.0	90.0	258.857	180.0

IMPEDANCE DATA

GAP NO	INPUT RESIST. OHMS	INPUT REACT. OHMS	INPUT CONDUCT. MHOS	INPUT SUSCEPT. MHOS	LOAD RESIST. OHMS	LOAD REACT. OHMS	GAP RESIST. OHMS	GAP REACT. OHMS	GAP VOLTAGE VOLT	GAP VOLTAGE DEGREES
1	.051	-4784.290	.000000	.000209	0.000	0.000	.040	-4784.290	1000.000	0.0
2	.051	-4784.290	.000000	.000209	0.000	0.000	.040	-4784.290	1000.000	0.0

INPUT POWER = .004 WATTS
RADIATED POWER = .003 WATTS
WIRE LOSS = .000 WATTS
NETWORK LOSS = .001 WATTS
RADIATION EFFICIENCY = 78.27 PER CENT

FREQUENCY = 2.8000 MC

NO GROUND PRESENT

MAXIMUM RELATIVE ASYMMETRY IN THE ANTENNA ADMITTANCE MATRIX IS .0 PER CENT FOR GAPS 2 AND 1

EXCITATION MODE 1

GAP SOURCES

GAP	EMF VOLT	EMF DEGREES	OHM	MICRO HENRY	PICO FARAD	
1	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES
2	1000.0000	180.00	-0.0000	-0.0000	INFINITY	SERIES

COORDINATES CURRENT DISTRIBUTION NORMAL ELECTRIC FIELD * RADIUS

WIRE NO	INT NO	X WAVE-LENGTHS	Y WAVE-LENGTHS	Z WAVE-LENGTHS	AMPLITUDE AMP	AMP	AMP	PHASE DEG	DEG	DEG	VOLTS	DEG
		0.0000	0.0000	-.0000	GAP 1			GAP 1			241.046	.1
1	1	0.0000	0.0000	.0071	4.6065	4.4361	4.2834	86.0	85.9	85.8	217.417	-.3
2	2	0.0000	0.0000	.0284	4.3065	4.0322	3.7396	85.8	85.6	85.4	190.738	-1.8
3	3	0.0000	0.0000	.0647	3.7484	3.2556	2.7067	85.4	85.2	85.0	226.398	-3.3
3	4	0.0000	0.0000	.1088	2.7138	2.1122	1.4621	85.0	84.8	84.6	271.967	-4.6
3	5	0.0000	0.0000	.1529	1.4846	.7761	.0000	84.6	84.4	-99.3	322.547	-5.4
		0.0000	0.0000	.0000	GAP 2			GAP 2			241.046	-179.9
4	6	0.0000	0.0000	-.0071	4.6065	4.4361	4.2834	-94.0	-94.1	-94.2	217.417	179.7
5	7	0.0000	0.0000	-.0284	4.3065	4.0322	3.7396	-94.2	-94.4	-94.6	190.738	178.2
6	8	0.0000	0.0000	-.0647	3.7484	3.2556	2.7067	-94.6	-94.8	-95.0	226.398	176.7
6	9	0.0000	0.0000	-.1088	2.7138	2.1122	1.4621	-95.0	-95.2	-95.4	271.967	175.4
6	10	0.0000	0.0000	-.1529	1.4846	.7761	.0000	-95.4	-95.6	80.7	322.547	174.6
		0.0000	-.0000	0.0000	GAP 3			GAP 3			.000	81.7
7	11	0.0000	.0049	0.0000	.0000	.0000	.0000	176.5	179.0	91.6	.000	86.5

IMPEDANCE DATA

GAP NO	INPUT RESIST. OHMS	INPUT REACT. OHMS	INPUT CONDUCT. MHOS	INPUT SUSCEPT. MHOS	LOAD RESIST. OHMS	LOAD REACT. OHMS	GAP RESIST. OHMS	GAP REACT. OHMS	GAP VOLTAGE VOLT	GAP VOLTAGE DEGREES
1	14.985	-216.568	.000318	.004595	0.000	0.000	14.985	-216.568	1000.000	0.0
2	14.985	-216.568	.000318	.004595	0.000	0.000	14.985	-216.568	1000.000	-180.0

INPUT POWER = 635.960 WATTS
RADIATED POWER = 635.960 WATTS
WIRE LOSS = .000 WATTS
NETWORK LOSS = 0.000 WATTS
RADIATION EFFICIENCY = 100.00 PER CENT

EXCITATION MODE 2

GAP SOURCES

GAP	EMF VOLT	EMF DEGREES	OHM	MICRO HENRY	PICO FARAD	
1	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES
2	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES

		COORDINATES			CURRENT DISTRIBUTION						NORMAL ELECTRIC FIELD * RADIUS	
		X	Y	Z	AMPLITUDE			PHASE				
WIRE NO	INT NO	WAVE-LENGTHS	WAVE-LENGTHS	WAVE-LENGTHS	AMP	AMP	AMP	DEG	DEG	DEG	VOLTS	DEG
		0.0000	0.0000	-.0000	GAP 1			GAP 1			120.615	.0
1	1	0.0000	0.0000	.0071	.2678	.1930	.1483	90.0	90.0	90.0	80.232	.0
2	2	0.0000	0.0000	.0284	.1769	.1497	.1296	90.0	90.0	90.0	15.889	.0
3	3	0.0000	0.0000	.0647	.1350	.1126	.0910	90.0	90.0	90.0	9.567	.0
3	4	0.0000	0.0000	.1088	.0922	.0706	.0482	90.0	89.9	89.9	9.551	-.0
3	5	0.0000	0.0000	.1529	.0492	.0255	.0000	89.9	89.9	-90.5	10.687	-.1
		0.0000	0.0000	.0000	GAP 2			GAP 2			120.615	.0
4	6	0.0000	0.0000	-.0071	.2678	.1930	.1483	90.0	90.0	90.0	80.232	.0
5	7	0.0000	0.0000	-.0284	.1769	.1497	.1296	90.0	90.0	90.0	15.889	.0
6	8	0.0000	0.0000	-.0647	.1350	.1126	.0910	90.0	90.0	90.0	9.567	.0
6	9	0.0000	0.0000	-.1088	.0922	.0706	.0482	90.0	89.9	89.9	9.551	-.0
6	10	0.0000	0.0000	-.1529	.0492	.0255	.0000	89.9	89.9	-90.5	10.687	-.1
		0.0000	-.0000	0.0000	GAP 3			GAP 3			263.040	180.0
7	11	0.0000	.0049	0.0000	.2678	.1332	.0000	-90.0	-90.0	-89.9	260.593	180.0

IMPEDANCE DATA

GAP NO	INPUT RESIST. OHMS	INPUT REACT. OHMS	INPUT CONDUCT. MHOS	INPUT SUSCEPT. MHOS	LOAD RESIST. OHMS	LOAD REACT. OHMS	GAP RESIST. OHMS	GAP REACT. OHMS	GAP VOLTAGE VOLT	GAP VOLTAGE DEGREES
1	.151	-3734.273	.000000	.000268	0.000	0.000	.151	-3734.273	1000.000	0.0
2	.151	-3734.273	.000000	.000268	0.000	0.000	.151	-3734.273	1000.000	0.0

INPUT POWER = .022 WATTS
RADIATED POWER = .022 WATTS
WIRE LOSS = .000 WATTS
NETWORK LOSS = 0.000 WATTS
RADIATION EFFICIENCY = 100.00 PER CENT

FREQUENCY = 3.9300 MC

NO GROUND PRESENT

MAXIMUM RELATIVE ASYMMETRY IN THE ANTENNA ADMITTANCE MATRIX IS .0 PER CENT FOR GAPS 2 AND 1

EXCITATION MODE 1

GAP SOURCES

GAP	EMF VOLT	EMF DEGREES	OHM	MICRO HENRY	PICO FARAD	
1	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES
2	1000.0000	180.00	-0.0000	-0.0000	INFINITY	SERIES

WIRE NO	INT NO	COORDINATES X WAVELENGTHS	Y WAVELENGTHS	Z WAVELENGTHS	CURRENT DISTRIBUTION AMPLITUDE AMP	AMP	AMP	PHASE DEG	DEG	DEG	NORMAL ELECTRIC FIELD * RADIUS VOLTS	DEG
		0.0000	0.0000	-.0000	GAP 1			GAP 1			245.502	-.3
1	1	0.0000	0.0000	.0100	24.9616	24.9575	24.8500	-10.9	-11.4	-11.8	204.171	-26.5
2	2	0.0000	0.0000	.0399	24.8439	24.3238	23.4194	-11.7	-12.3	-12.9	360.338	-83.7
3	3	0.0000	0.0000	.0908	23.4221	21.2901	18.3365	-12.8	-13.5	-14.1	792.750	-98.4
3	4	0.0000	0.0000	.1527	18.3653	14.6710	10.3451	-14.1	-14.6	-15.0	1245.828	-102.8
3	5	0.0000	0.0000	.2146	10.5018	5.5496	.0000	-15.0	-15.4	156.6	1630.639	-105.0
		0.0000	0.0000	.0000	GAP 2			GAP 2			245.502	179.7
4	6	0.0000	0.0000	-.0100	24.9616	24.9575	24.8500	169.1	168.6	168.2	204.171	153.5
5	7	0.0000	0.0000	-.0399	24.8439	24.3238	23.4194	168.3	167.7	167.1	360.338	96.3
6	8	0.0000	0.0000	-.0908	23.4221	21.2901	18.3365	167.2	166.5	165.9	792.750	81.6
6	9	0.0000	0.0000	-.1527	18.3653	14.6710	10.3451	165.9	165.4	165.0	1245.828	77.2
6	10	0.0000	0.0000	-.2146	10.5018	5.5496	.0000	165.0	164.6	-23.4	1630.639	75.0
		0.0000	0.0000	0.0000	GAP 3			GAP 3			.000	113.1
7	11	0.0000	.0069	0.0000	.0000	.0000	.0000	-173.6	-178.0	-18.3	.000	96.3

IMPEDANCE DATA

GAP NO	INPUT RESIST. OHMS	INPUT REACT. OHMS	INPUT CONDUCT. MHOS	INPUT SUSCEPT. MHOS	LOAD RESIST. OHMS	LOAD REACT. OHMS	GAP RESIST. OHMS	GAP REACT. OHMS	GAP VOLTAGE VOLT	GAP VOLTAGE DEGREES
1	39.345	7.545	.024515	-.004701	0.000	0.000	39.345	7.545	1000.000	0.0
2	39.345	7.545	.024515	-.004701	0.000	0.000	39.345	7.545	1000.000	-180.0

INPUT POWER = 49029.722 WATTS
RADIATED POWER = 49029.722 WATTS
WIRE LOSS = .000 WATTS
NETWORK LOSS = 0.000 WATTS
RADIATION EFFICIENCY = 100.00 PER CENT

EXCITATION MODE 2

C-8

GAP SOURCES

GAP	EMF VOLT	EMF DEGREES	OHM	MICRO HENRY	PICO FARAD	
1	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES
2	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES

WIRE NO	INT NO	COORDINATES X WAVE-LENGTHS	Y WAVE-LENGTHS	Z WAVE-LENGTHS	CURRENT DISTRIBUTION AMPLITUDE AMP	AMP	AMP	PHASE DEG	DEG	DEG	NORMAL ELECTRIC FIELD * RADIUS VOLTS	DEG
		0.0000	0.0000	-.0000	GAP 1			GAP 1			118.245	.0
1	1	0.0000	0.0000	.0100	.3832	.2807	.2209	90.0	90.0	89.9	77.674	.0
2	2	0.0000	0.0000	.0399	.2618	.2297	.2059	90.0	89.9	89.9	13.403	.3
3	3	0.0000	0.0000	.0908	.2137	.1860	.1557	89.9	89.8	89.7	9.011	.2
3	4	0.0000	0.0000	.1527	.1575	.1239	.0863	89.7	89.7	89.6	11.066	-.1
3	5	0.0000	0.0000	.2146	.0880	.0462	.0000	89.6	89.5	-92.1	13.660	-.4
		0.0000	0.0000	.0000	GAP 2			GAP 2			118.245	.0

WIRE NO	INT NO	X WAVE-LENGTHS	Y WAVE-LENGTHS	Z WAVE-LENGTHS	AMPLITUDE AMP	AMP	AMP	PHASE DEG	DEG	DEG	VOLTS	DEG
4	6	0.0000	0.0000	-.0100	.3832	.2807	.2209	90.0	90.0	89.9	77.674	.0
5	7	0.0000	0.0000	-.0399	.2618	.2297	.2059	90.0	89.9	89.9	13.403	.3
6	8	0.0000	0.0000	-.0908	.2137	.1860	.1557	89.9	89.8	89.7	9.011	.2
6	9	0.0000	0.0000	-.1527	.1575	.1239	.0863	89.7	89.7	89.6	11.066	-.1
6	10	0.0000	0.0000	-.2146	.0880	.0462	.0000	89.6	89.5	-92.1	13.660	-.4
		0.0000	0.0000	0.0000	GAP 3			GAP 3			266.266	180.0
7	11	0.0000	.0069	0.0000	.3832	.1913	.0000	-90.0	-90.0	-87.3	265.689	180.0

IMPEDANCE DATA

GAP NO	INPUT RESIST. OHMS	INPUT REACT. OHMS	INPUT CONDUCT. MHOS	INPUT SUSCEPT. MHOS	LOAD RESIST. OHMS	LOAD REACT. OHMS	GAP RESIST. OHMS	GAP REACT. OHMS	GAP VOLTAGE VOLT	DEGREES
1	.746	-2609.918	.000000	.000383	0.000	0.000	.746	-2609.918	1000.000	0.0
2	.746	-2609.918	.000000	.000383	0.000	0.000	.746	-2609.918	1000.000	0.0

INPUT POWER = .219 WATTS
RADIATED POWER = .219 WATTS
WIRE LOSS = .000 WATTS
NETWORK LOSS = 0.000 WATTS
RADIATION EFFICIENCY = 100.00 PER CENT

FREQUENCY = 4.7000 MC

NO GROUND PRESENT

MAXIMUM RELATIVE ASYMMETRY IN THE ANTENNA ADMITTANCE MATRIX IS .0 PER CENT FOR GAPS 2 AND 1

EXCITATION MODE 1

GAP SOURCES

GAP	EMF VOLT	EMF DEGREES	OHM	MICRO HENRY	PICO FARAD	
1	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES
2	1000.0000	180.00	-0.0000	-0.0000	INFINITY	SERIES

	COORDINATES			CURRENT DISTRIBUTION						NORMAL ELECTRIC FIELD * RADIUS	
	X	Y	Z	AMPLITUDE			PHASE				
WIRE NO	INT NO	WAVE-LENGTHS	WAVE-LENGTHS	WAVE-LENGTHS	AMP	AMP	AMP	DEG	DEG	DEG	VOLTS	DEG
		0.0000	0.0000	-.0000	GAP 1			GAP 1			241.659	-.4
1	1	0.0000	0.0000	.0119	5.6583	5.8955	6.0609	-64.6	-65.8	-66.7	181.333	-2.9
2	2	0.0000	0.0000	.0478	6.0252	6.1693	6.1559	-66.5	-67.7	-68.6	52.727	-37.8
3	3	0.0000	0.0000	.1086	6.1443	5.8228	5.1726	-68.6	-69.7	-70.7	129.223	-147.8
3	4	0.0000	0.0000	.1827	5.1763	4.2273	3.0263	-70.6	-71.4	-72.1	280.201	-158.6
3	5	0.0000	0.0000	.2567	3.0716	1.6369	.0000	-72.0	-72.6	-75.7	399.886	-162.0
		0.0000	0.0000	.0000	GAP 2			GAP 2			241.659	179.6
4	6	0.0000	0.0000	-.0119	5.6583	5.8955	6.0609	115.4	114.2	113.3	181.333	177.1
5	7	0.0000	0.0000	-.0478	6.0252	6.1693	6.1559	113.5	112.3	111.4	52.727	142.2
6	8	0.0000	0.0000	-.1086	6.1443	5.8228	5.1726	111.4	110.3	109.3	129.223	32.2
6	9	0.0000	0.0000	-.1827	5.1763	4.2273	3.0263	109.4	108.6	107.9	280.201	21.4
6	10	0.0000	0.0000	-.2567	3.0716	1.6369	.0000	108.0	107.4	104.3	399.886	18.0
		0.0000	0.0000	0.0000	GAP 3			GAP 3			.000	99.4
7	11	0.0000	.0082	0.0000	.0000	.0000	.0000	-176.0	-178.6	115.1	.000	94.0

IMPEDANCE DATA

GAP NO	INPUT RESIST. OHMS	INPUT REACT. OHMS	INPUT CONDUCT. MHOS	INPUT SUSCEPT. MHOS	LOAD RESIST. OHMS	LOAD REACT. OHMS	GAP RESIST. OHMS	GAP REACT. OHMS	GAP VOLTAGE VOLT	GAP VOLTAGE DEGREES
1	75.729	159.684	.002425	-.005113	0.000	0.000	75.729	159.684	1000.000	0.0
2	75.729	159.684	.002425	-.005113	0.000	0.000	75.729	159.684	1000.000	-180.0

INPUT POWER = 4849.179 WATTS
RADIATED POWER = 4849.179 WATTS
WIRE LOSS = .000 WATTS
NETWORK LOSS = 0.000 WATTS
RADIATION EFFICIENCY = 100.00 PER CENT

EXCITATION MODE 2

GAP SOURCES

GAP	EMF VOLT	EMF DEGREES	OHM	MICRO HENRY	PICO FARAD	
1	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES
2	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES

		COORDINATES			CURRENT DISTRIBUTION						NORMAL ELECTRIC FIELD * RADIUS	
		X	Y	Z	AMPLITUDE			PHASE				
WIRE NO	INT NO	WAVE-LENGTHS	WAVE-LENGTHS	WAVE-LENGTHS	AMP	AMP	AMP	DEG	DEG	DEG	VOLTS	DEG
		0.0000	0.0000	-.0000	GAP 1			GAP 1			115.530	.1
1	1	0.0000	0.0000	.0119	.4681	.3491	.2817	89.9	89.9	89.8	74.627	.1
2	2	0.0000	0.0000	.0478	.3317	.3021	.2804	89.8	89.7	89.6	10.291	1.1
3	3	0.0000	0.0000	.1086	.2901	.2632	.2276	89.6	89.4	89.3	8.141	.8
3	4	0.0000	0.0000	.1827	.2300	.1852	.1312	89.3	89.1	89.0	12.859	-.3
3	5	0.0000	0.0000	.2567	.1338	.0709	.0000	89.0	88.8	88.0	17.420	-1.0
		0.0000	0.0000	.0000	GAP 2			GAP 2			115.530	.1
4	6	0.0000	0.0000	-.0119	.4681	.3491	.2817	89.9	89.9	89.8	74.627	.1
5	7	0.0000	0.0000	-.0478	.3317	.3021	.2804	89.8	89.7	89.6	10.291	1.1
6	8	0.0000	0.0000	-.1086	.2901	.2632	.2276	89.6	89.4	89.3	8.141	.8
6	9	0.0000	0.0000	-.1827	.2300	.1852	.1312	89.3	89.1	89.0	12.859	-.3
6	10	0.0000	0.0000	-.2567	.1338	.0709	.0000	89.0	88.8	88.0	17.420	-1.0
		0.0000	0.0000	0.0000	GAP 3			GAP 3			269.959	180.0
7	11	0.0000	.0082	0.0000	.4681	.2345	.0000	-90.1	-90.1	-92.0	271.425	179.9

IMPEDANCE DATA

GAP NO	INPUT RESIST. OHMS	INPUT REACT. OHMS	INPUT CONDUCT. MHOS	INPUT SUSCEPT. MHOS	LOAD RESIST. OHMS	LOAD REACT. OHMS	GAP RESIST. OHMS	GAP REACT. OHMS	GAP VOLTAGE VOLT	GAP VOLTAGE DEGREES
1	2.050	-2136.507	.000000	.000468	0.000	0.000	2.050	-2136.507	1000.000	0.0
2	2.050	-2136.507	.000000	.000468	0.000	0.000	2.050	-2136.507	1000.000	0.0

INPUT POWER = .898 WATTS
RADIATED POWER = .898 WATTS
WIRE LOSS = .000 WATTS
NETWORK LOSS = 0.000 WATTS
RADIATION EFFICIENCY = 100.00 PER CENT

FREQUENCY = 6.5500 MC

NO GROUND PRESENT

MAXIMUM RELATIVE ASYMMETRY IN THE ANTENNA ADMITTANCE MATRIX IS .0 PER CENT FOR GAPS 2 AND 1

EXCITATION MODE 1

GAP SOURCES

GAP	EMF VOLT	EMF DEGREES	OHM	MICRO HENRY	PICO FARAD	
1	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES
2	1000.0000	180.00	-0.0000	-0.0000	INFINITY	SERIES

WIRE NO	INT NO	COORDINATES X WAVELENGTHS	Y WAVELENGTHS	Z WAVELENGTHS	CURRENT DISTRIBUTION AMPLITUDE X AMP	Y AMP	Z AMP	PHASE X DEG	Y DEG	Z DEG	NORMAL ELECTRIC FIELD * RADIUS VOLTS	DEG
		0.0000	0.0000	-.0000	GAP 1			GAP 1			241.443	-.3
1	1	0.0000	0.0000	.0166	1.0210	1.3380	1.6117	-50.5	-61.1	-66.6	198.793	-.8
2	2	0.0000	0.0000	.0665	1.5612	1.9537	2.2450	-65.8	-71.5	-74.9	107.708	-4.2
3	3	0.0000	0.0000	.1514	2.2257	2.4510	2.4116	-74.7	-77.9	-79.9	26.500	-36.0
3	4	0.0000	0.0000	.2545	2.4081	2.1075	1.5785	-79.9	-81.3	-82.5	78.615	-164.9
3	5	0.0000	0.0000	.3577	1.6027	.8752	.0000	-82.4	-83.3	-71.6	151.001	-172.4
		0.0000	0.0000	.0000	GAP 2			GAP 2			241.443	179.7
4	6	0.0000	0.0000	-.0166	1.0210	1.3380	1.6117	129.5	118.9	113.4	198.793	179.2
5	7	0.0000	0.0000	-.0665	1.5612	1.9537	2.2450	114.2	108.5	105.1	107.708	175.8

WIRE NO	INT NO	X WAVE-LENGTHS	Y WAVE-LENGTHS	Z WAVE-LENGTHS	AMPLITUDE X AMP	AMPLITUDE Y AMP	AMPLITUDE Z AMP	PHASE X DEG	PHASE Y DEG	PHASE Z DEG	VOLTS	DEG
6	8	0.0000	0.0000	-.1514	2.2257	2.4510	2.4116	105.3	102.1	100.1	26.500	144.0
6	9	0.0000	0.0000	-.2545	2.4081	2.1075	1.5785	100.1	98.7	97.5	78.615	15.1
6	10	0.0000	0.0000	-.3577	1.6027	.8752	.0000	97.6	96.7	108.4	151.001	7.6
		0.0000	-.0000	0.0000	GAP 3			GAP 3			.000	92.9
7	11	0.0000	.0115	0.0000	.0000	.0000	.0000	-179.9	178.8	-39.5	.000	90.1

IMPEDANCE DATA

GAP NO	INPUT RESIST. OHMS	INPUT REACT. OHMS	INPUT CONDUCT. MHOS	INPUT SUSCEPT. MHOS	LOAD RESIST. OHMS	LOAD REACT. OHMS	GAP RESIST. OHMS	GAP REACT. OHMS	GAP VOLTAGE VOLT	GAP VOLTAGE DEGREES
1	622.761	755.877	.000649	-.000788	0.000	0.000	622.761	755.877	1000.000	0.0
2	622.761	755.877	.000649	-.000788	0.000	0.000	622.761	755.877	1000.000	-180.0

INPUT POWER = 1298.526 WATTS
RADIATED POWER = 1298.526 WATTS
WIRE LOSS = .000 WATTS
NETWORK LOSS = 0.000 WATTS
RADIATION EFFICIENCY = 100.00 PER CENT

EXCITATION MODE 2

GAP SOURCES

GAP	EMF VOLT	EMF DEGREES	OHM	MICRO HENRY	PICO FARAD	
1	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES
2	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES

COORDINATES CURRENT DISTRIBUTION NORMAL ELECTRIC FIELD * RADIUS

WIRE NO	INT. NO	X WAVE-LENGTHS	Y WAVE-LENGTHS	Z WAVE-LENGTHS	AMPLITUDE AMP	AMP	AMP	PHASE DEG	DEG	DEG	VOLTS	DEG
		0.0000	0.0000	-.0000	GAP 1			GAP 1			94.420	2.4
1	1	0.0000	0.0000	.0166	.7555	.6306	.5848	88.6	87.6	86.5	49.593	5.7
2	2	0.0000	0.0000	.0665	.6653	.7312	.7898	86.8	85.4	84.4	18.519	161.8
3	3	0.0000	0.0000	.1514	.8058	.8597	.8341	84.4	83.3	82.5	3.704	129.4
3	4	0.0000	0.0000	.2545	.8394	.7314	.5467	82.5	81.8	81.2	27.609	-5.2
3	5	0.0000	0.0000	.3577	.5572	.3047	.0000	81.2	80.7	87.5	52.498	-8.8
		0.0000	0.0000	.0000	GAP 2			GAP 2			94.420	2.4
4	6	0.0000	0.0000	-.0166	.7555	.6306	.5848	88.6	87.6	86.5	49.593	5.7
5	7	0.0000	0.0000	-.0665	.6653	.7312	.7898	86.8	85.4	84.4	18.519	161.8
6	8	0.0000	0.0000	-.1514	.8058	.8597	.8341	84.4	83.3	82.5	3.704	129.4
6	9	0.0000	0.0000	-.2545	.8394	.7314	.5467	82.5	81.8	81.2	27.609	-5.2
6	10	0.0000	0.0000	-.3577	.5572	.3047	.0000	81.2	80.7	87.5	52.498	-8.8
		0.0000	-.0000	0.0000	GAP 3			GAP 3			298.447	179.0
7	11	0.0000	.0115	0.0000	.7555	.3869	.0000	-91.4	-91.6	79.6	314.509	178.6

IMPEDANCE DATA

GAP NO	INPUT RESIST. OHMS	INPUT REACT. OHMS	INPUT CONDUCT. MHOS	INPUT SUSCEPT. MHOS	LOAD RESIST. OHMS	LOAD REACT. OHMS	GAP RESIST. OHMS	GAP REACT. OHMS	GAP VOLTAGE VOLT	DEGREES
1	32.612	-1323.209	.000019	.000755	0.000	0.000	32.612	-1323.209	1000.000	0.0
2	32.612	-1323.209	.000019	.000755	0.000	0.000	32.612	-1323.209	1000.000	0.0

INPUT POWER = 37.229 WATTS
RADIATED POWER = 37.229 WATTS
WIRE LOSS = .000 WATTS
NETWORK LOSS = 0.000 WATTS
RADIATION EFFICIENCY = 100.00 PER CENT

FREQUENCY = 9.1800 MC

NO GROUND PRESENT

MAXIMUM RELATIVE ASYMMETRY IN THE ANTENNA ADMITTANCE MATRIX IS .0 PER CENT FOR GAPS 2 AND 1

EXCITATION MODE 1

GAP SOURCES

GAP	EMF VOLT	EMF DEGREES	OHM	MICRO HENRY	PICO FARAD	
1	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES
2	1000.0000	180.00	-0.0000	-0.0000	INFINITY	SERIES

WIRE NO	INT NO	COORDINATES X WAVELENGTHS	Y WAVELENGTHS	Z WAVELENGTHS	CURRENT DISTRIBUTION AMPLITUDE AMP	AMP	AMP	PHASE DEG	DEG	DEG	NORMAL ELECTRIC FIELD * RADIUS VOLTS	DEG
		0.0000	0.0000	-.0000	GAP 1			GAP 1			241.644	-.3
1	1	0.0000	0.0000	.0233	1.7207	1.1909	.7590	73.7	66.3	51.8	216.817	-.8
2	2	0.0000	0.0000	.0933	.8243	.4670	1.0055	55.2	-19.0	-66.7	166.424	-2.6
3	3	0.0000	0.0000	.2122	.9767	1.8816	2.4397	-66.0	-80.6	-85.2	106.099	-7.2
3	4	0.0000	0.0000	.3568	2.4334	2.5019	2.0663	-85.1	-87.5	-89.1	27.200	-154.4
3	5	0.0000	0.0000	.5013	2.1057	1.2118	.0000	-89.0	-90.1	85.9	143.992	-179.0
		0.0000	0.0000	.0000	GAP 2			GAP 2			241.644	179.7
4	6	0.0000	0.0000	-.0233	1.7207	1.1909	.7590	-106.3	-113.7	-128.2	216.817	179.2
5	7	0.0000	0.0000	-.0933	.8243	.4670	1.0055	-124.8	161.0	113.3	166.424	177.4
6	8	0.0000	0.0000	-.2122	.9767	1.8816	2.4397	114.0	99.4	94.8	106.099	172.8
6	9	0.0000	0.0000	-.3568	2.4334	2.5019	2.0663	94.9	92.5	90.9	27.200	25.6
6	10	0.0000	0.0000	-.5013	2.1057	1.2118	.0000	91.0	89.9	-94.1	143.992	1.0
		0.0000	0.0000	0.0000	GAP 3			GAP 3			.000	89.3
7	11	0.0000	.0161	0.0000	.0000	.0000	.0000	177.5	176.5	35.1	.000	87.5

IMPEDANCE DATA

GAP NO	INPUT RESIST. OHMS	INPUT REACT. OHMS	INPUT CONDUCT. MHOS	INPUT SUSCEPT. MHOS	LOAD RESIST. OHMS	LOAD REACT. OHMS	GAP RESIST. OHMS	GAP REACT. OHMS	GAP VOLTAGE VOLT	DEGREES
1	163.354	-557.734	.000484	.001651	0.000	0.000	163.354	-557.734	1000.000	0.0
2	163.354	-557.734	.000484	.001651	0.000	0.000	163.354	-557.734	1000.000	-180.0

INPUT POWER = 967.303 WATTS
RADIATED POWER = 967.303 WATTS
WIRE LOSS = .000 WATTS
NETWORK LOSS = 0.000 WATTS
RADIATION EFFICIENCY = 100.00 PER CENT

AVERAGE GAIN = .9189

PRODUCED BINARY DECK NO. 405

EXCITATION MODE 2

GAP SOURCES

GAP	EMF VOLT	EMF DEGREES	OHM	MICRO HENRY	PICO FARAD	
1	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES
2	1000.0000	-0.00	-0.0000	-0.0000	-INFINITY	SERIES

WIRE NO	INT NO	COORDINATES X WAVELENGTHS	Y WAVELENGTHS	Z WAVELENGTHS	CURRENT DISTRIBUTION AMPLITUDE AMP	AMP	AMP	PHASE DEG	DEG	DEG	NORMAL ELECTRIC FIELD * RADIUS VOLTS	DEG
		0.0000	0.0000	-.0000	GAP 1			GAP 1			142.380	2.6
1	1	0.0000	0.0000	.0233	.7505	.4439	.2253	86.6	82.0	68.3	111.239	4.2
2	2	0.0000	0.0000	.0933	.3065	.1352	.3130	73.4	2.2	-56.0	58.181	9.0
3	3	0.0000	0.0000	.2122	.2988	.6091	.8029	-54.3	-69.5	-74.0	36.332	5.0
3	4	0.0000	0.0000	.3568	.8005	.8297	.6884	-74.1	-76.5	-78.1	8.444	-141.2
3	5	0.0000	0.0000	.5013	.7008	.4044	.0000	-78.2	-79.4	96.3	47.922	-168.2
		0.0000	0.0000	.0000	GAP 2			GAP 2			142.380	2.6
4	6	0.0000	0.0000	-.0233	.7505	.4439	.2253	86.6	82.0	68.3	111.239	4.2
5	7	0.0000	0.0000	-.0933	.3065	.1352	.3130	73.4	2.2	-56.0	58.181	9.0
6	8	0.0000	0.0000	-.2122	.2988	.6091	.8029	-54.3	-69.5	-74.0	36.332	5.0
6	9	0.0000	0.0000	-.3568	.8005	.8297	.6884	-74.1	-76.5	-78.1	8.444	-141.2
6	10	0.0000	0.0000	-.5013	.7008	.4044	.0000	-78.2	-79.4	96.3	47.922	-168.2
		0.0000	0.0000	0.0000	GAP 3			GAP 3			235.769	177.9
7	11	0.0000	.0161	0.0000	.7505	.3637	.0000	-93.4	-94.0	111.2	223.096	176.6

IMPEDANCE DATA

GAP NO	INPUT RESIST. OHMS	INPUT REACT. OHMS	INPUT CONDUCT. MHOS	INPUT SUSCEPT. MHOS	LOAD RESIST. OHMS	LOAD REACT. OHMS	GAP RESIST. OHMS	GAP REACT. OHMS	GAP VOLTAGE VOLT	GAP VOLTAGE DEGREES
1	77.973	-1330.205	.000044	.000749	0.000	0.000	77.973	-1330.205	1000.000	0.0
2	77.973	-1330.205	.000044	.000749	0.000	0.000	77.973	-1330.205	1000.000	0.0

INPUT POWER = 87.831 WATTS
RADIATED POWER = 87.831 WATTS
WIRE LOSS = .000 WATTS
NETWORK LOSS = 0.000 WATTS
RADIATION EFFICIENCY = 100.00 PER CENT

AVERAGE GAIN = .9953

PRODUCED BINARY DECK NO. 406

APPENDIX D

RADIATION PATTERNS FOR DIPOLE ALONE ON SATELLITE

Pattern in a single principal plane is sufficient. See Appendix B for further discussion.

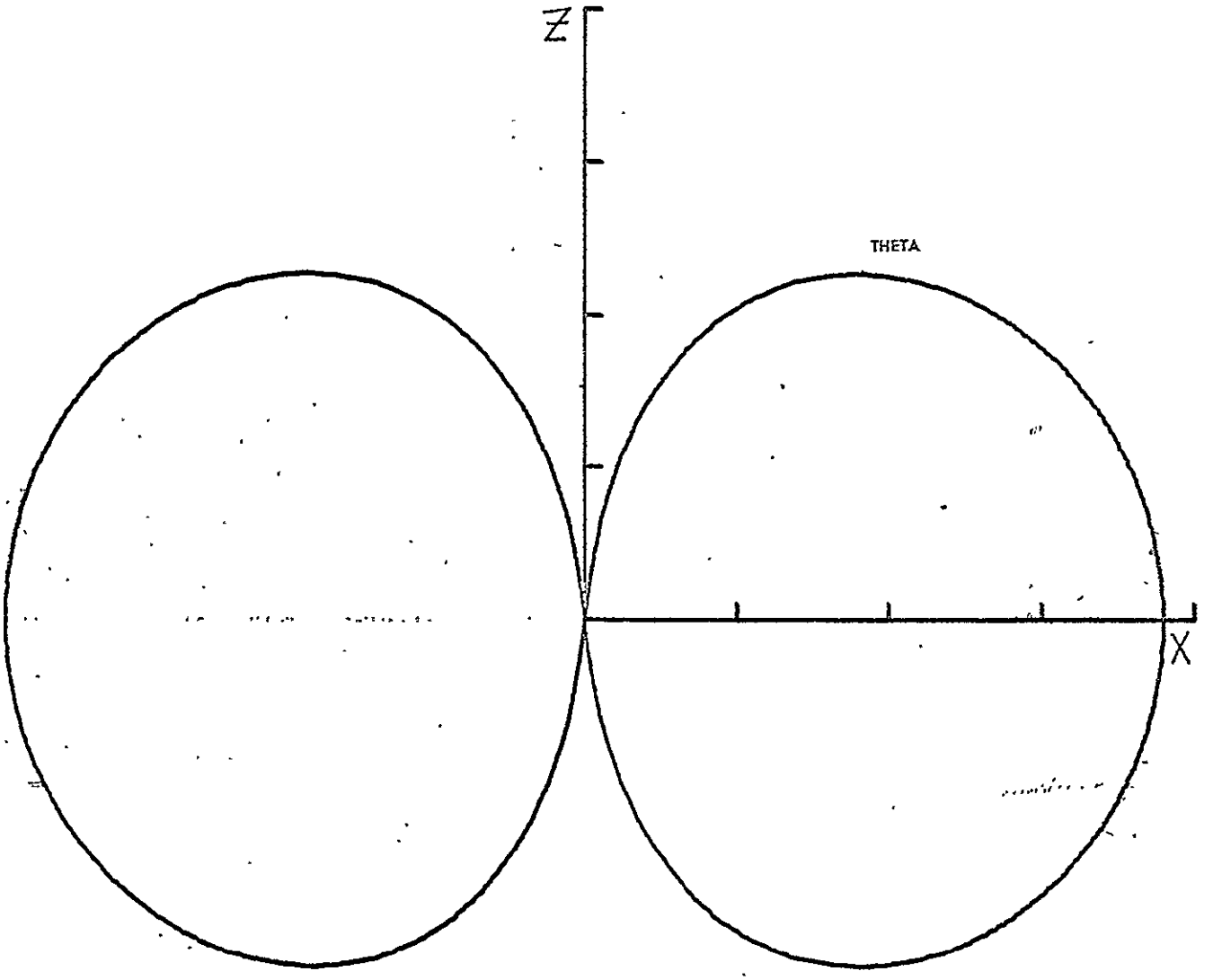

FIGURE D-1.

FREQUENCY (MHZ) .202 - 2.20
V-ANT. LENGTH (FT) DIPOLE ALONE
MODE BALANCED
DB MAX +2.7
DB MIN -17.3

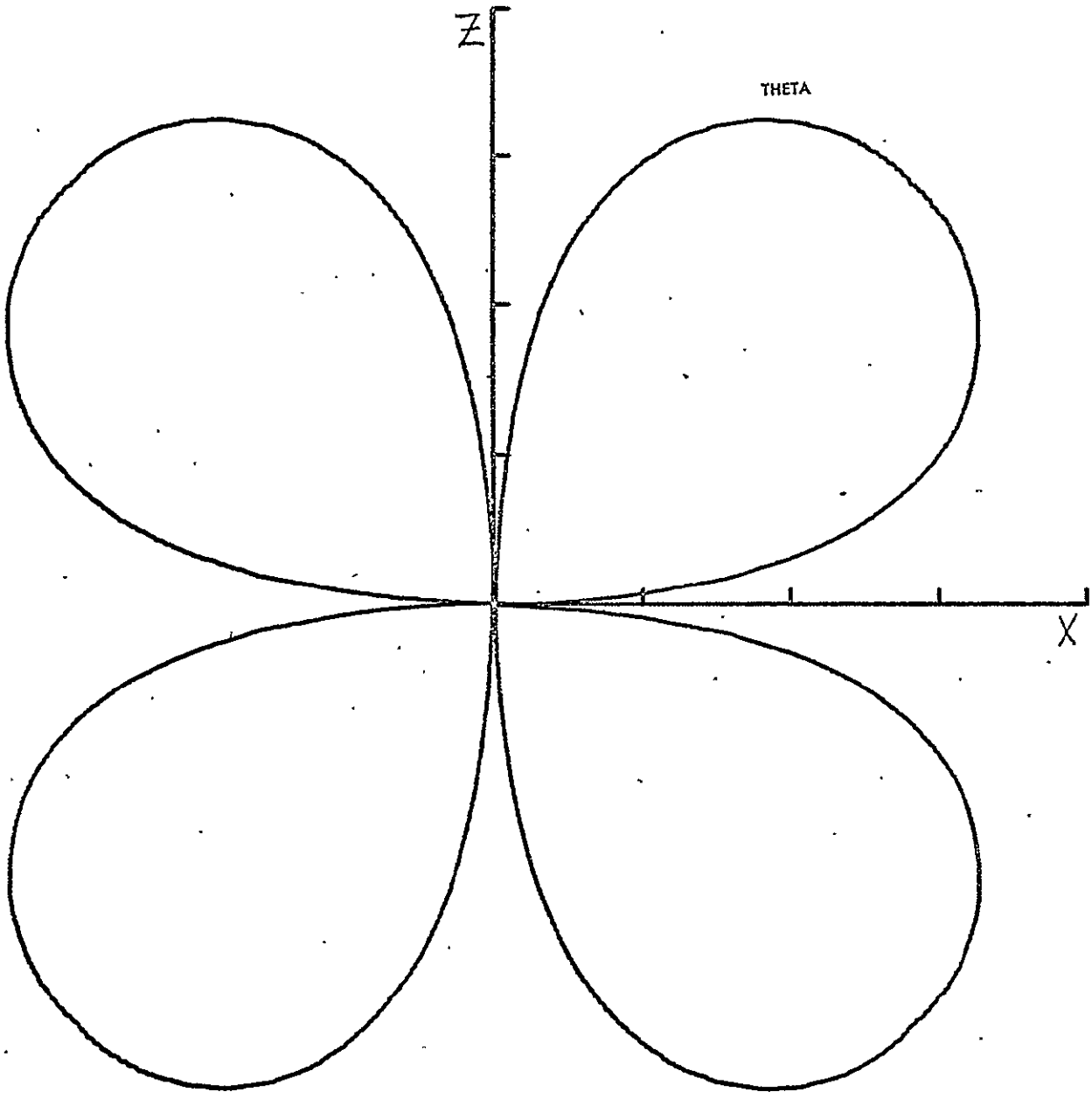

FIGURE D-2

FREQUENCY (MHZ) .202-2.20
V-ANT. LENGTH (FT) DIPOLE ALONE
MODE UNBALANCED
DB MAX +2.7
DB MIN -17.3

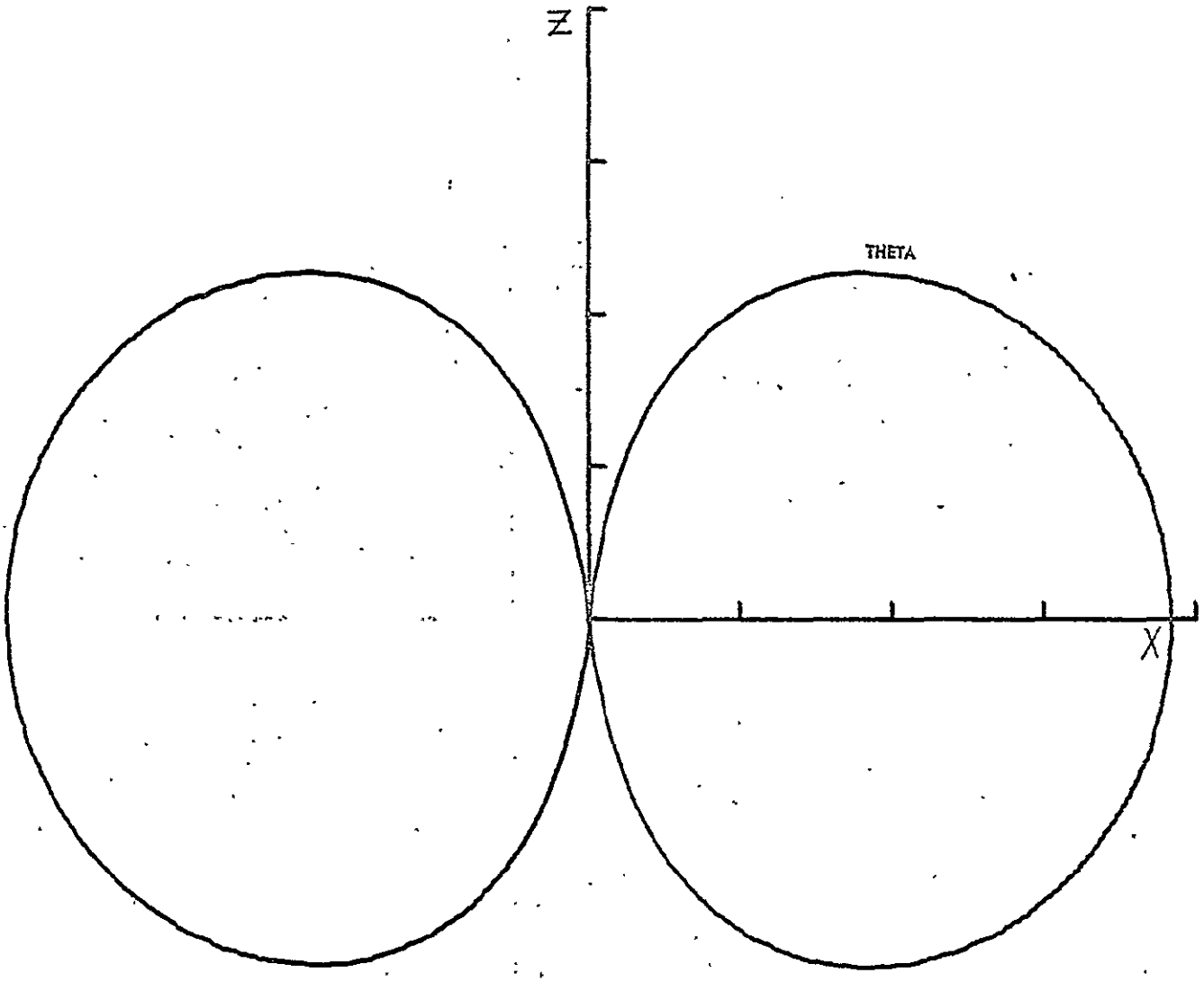

FIGURE D-3

FREQUENCY (MHZ) 2.80
V-ANT. LENGTH (FT) DIPOLE ALONE
MODE BALANCED
DB MAX +2.5
DB MIN -17.5

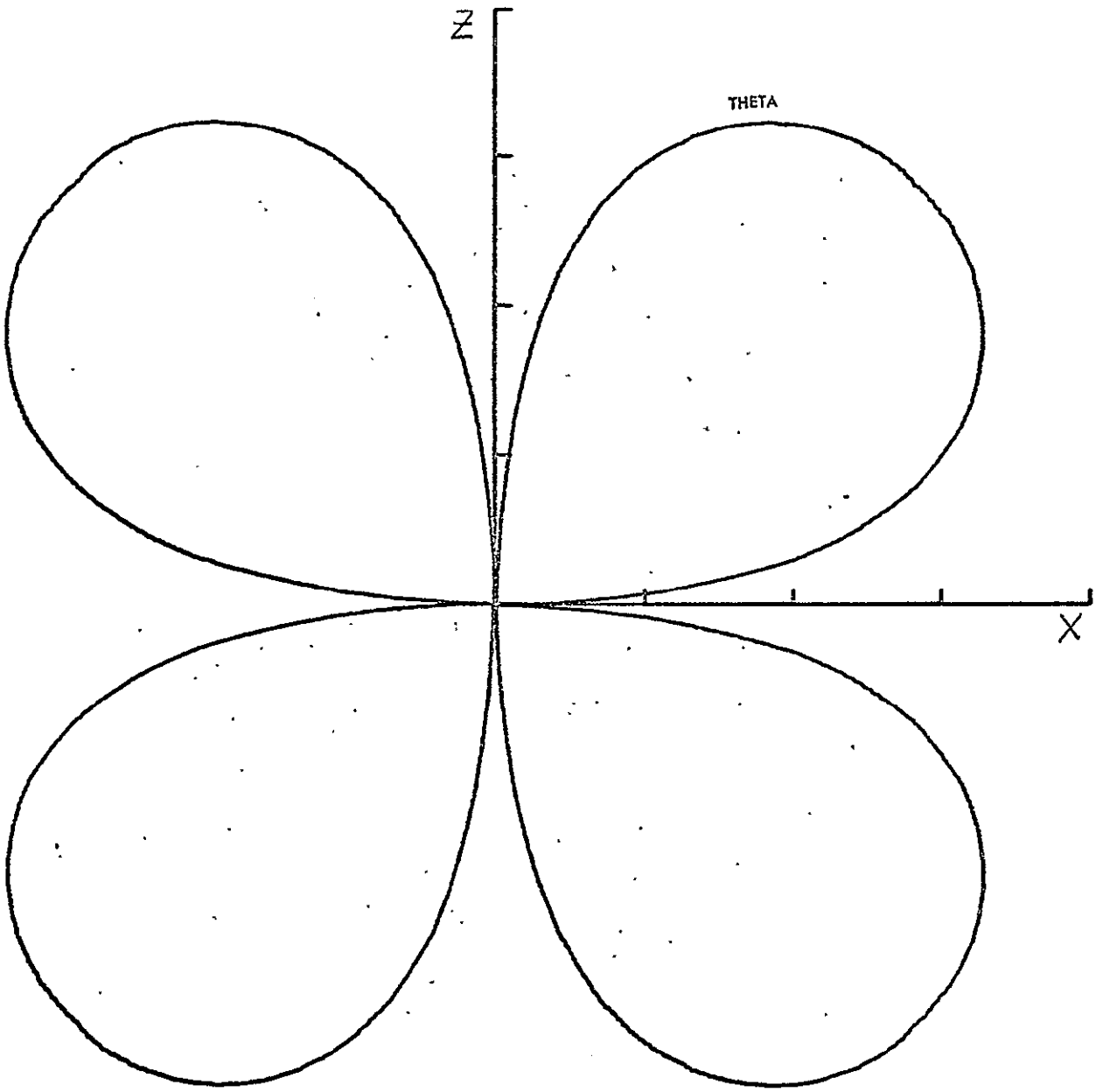

FIGURE D-4

FREQUENCY (MHZ) 2.80
V-ANT. LENGTH (FT) DIPOLE ALONE
MODE UNBALANCED
DB MAX +2.5
DB MIN -17.5

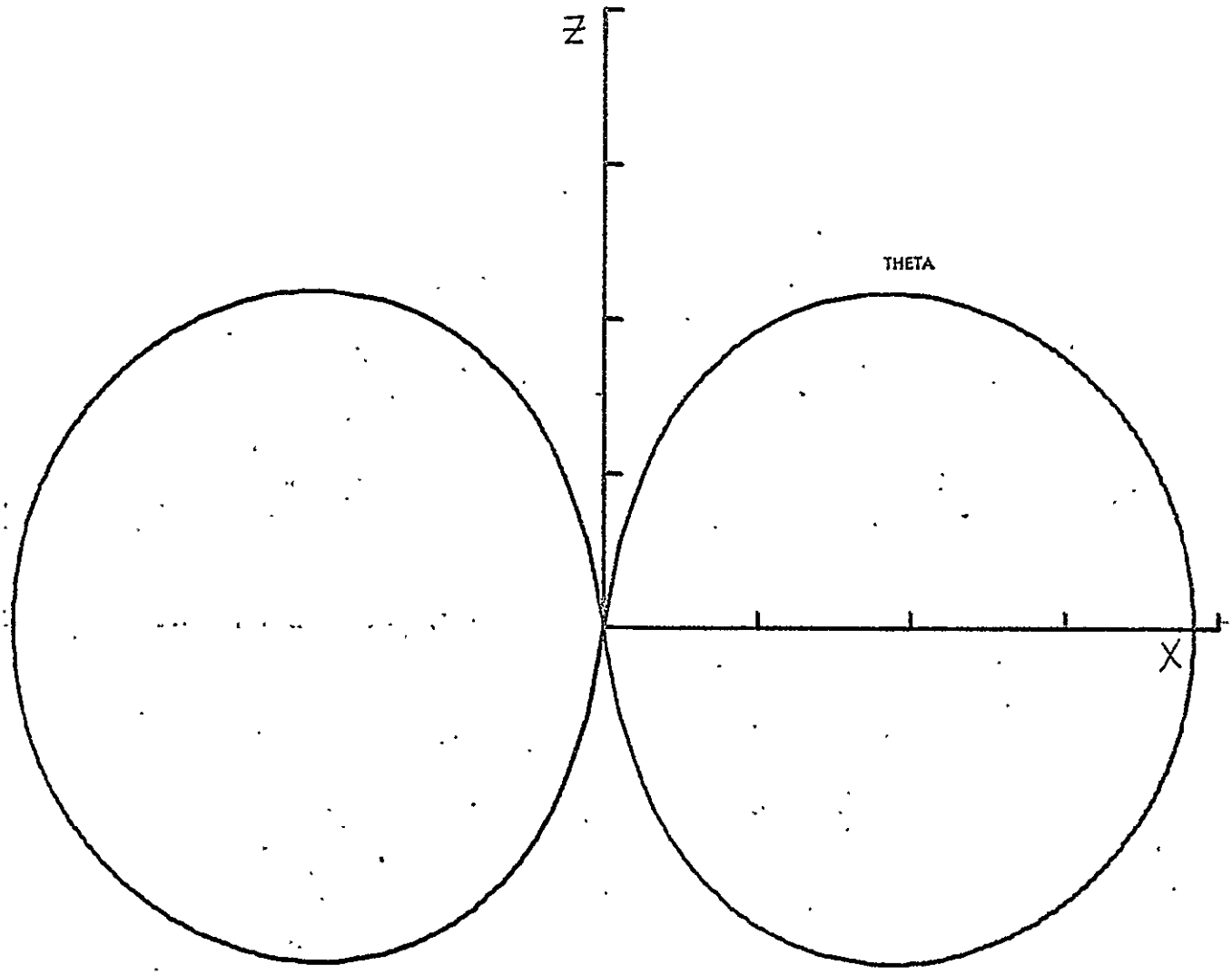

FIGURE D-5

FREQUENCY (MHZ) 3.93
V-ANT. LENGTH (FT) DIPOLE ALONE
MODE BALANCED
DB MAX +2.7
DB MIN -17.3

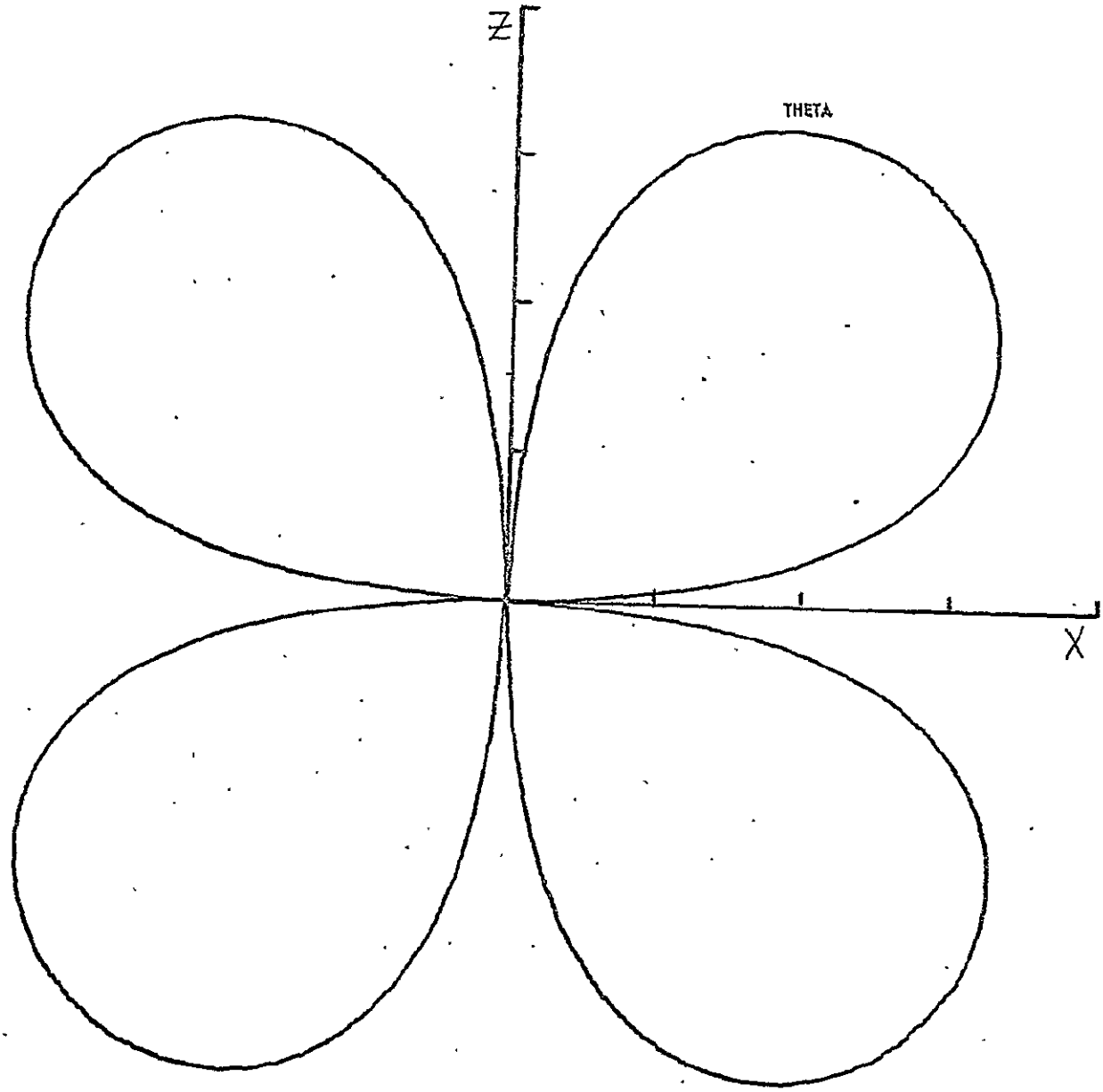

FIGURE D-6

FREQUENCY (MHZ) 3.93
V-ANT. LENGTH (FT) DIPOLE ALONE
MODE UNBALANCED
DB MAX +2.7
DB MIN -17.3

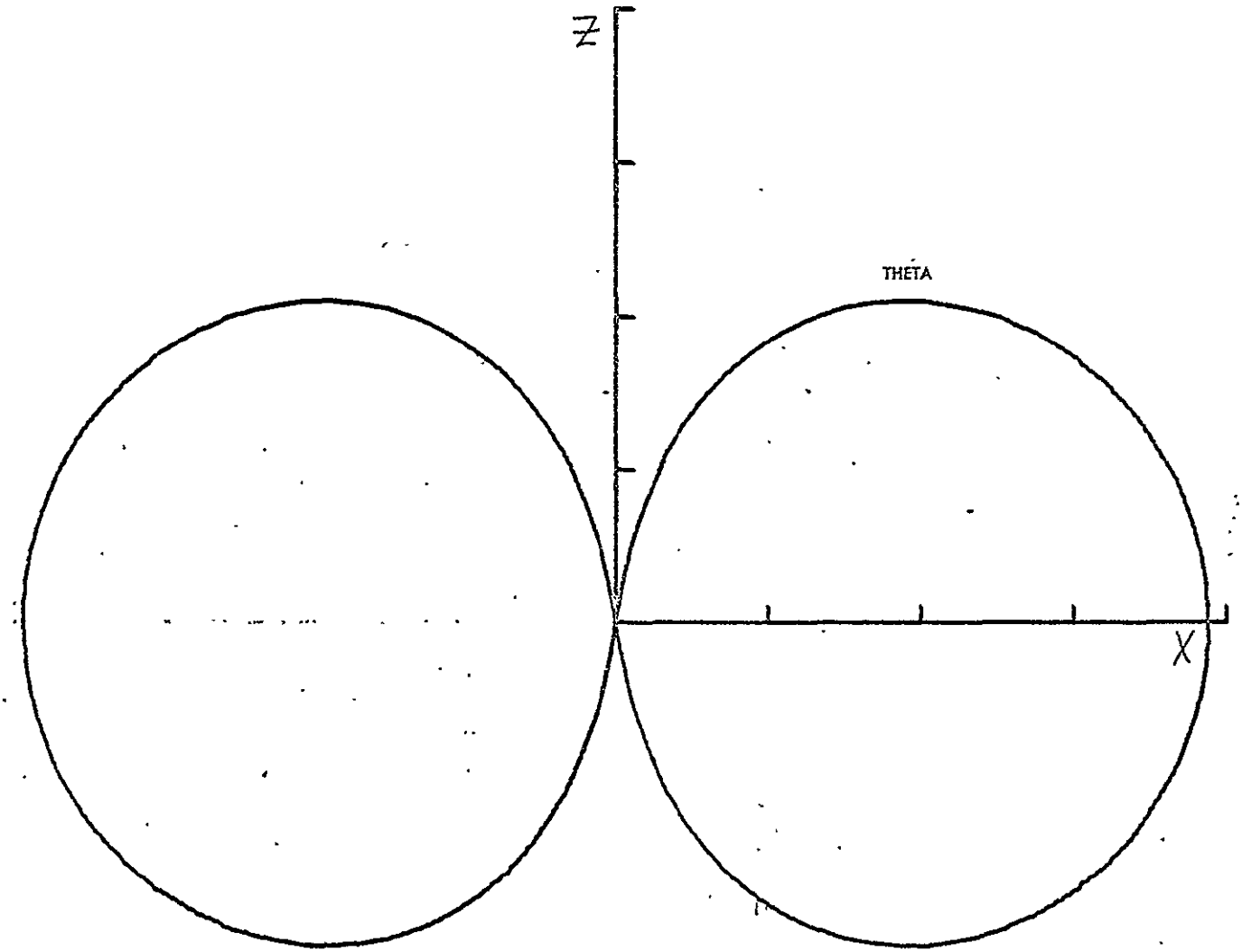

FIGURE D-7

FREQUENCY (MHZ) 4.70
V-ANT. LENGTH (FT) DIPOLE ALONE
MODE BALANCED
DB MAX +2.7
DB MIN -17.3

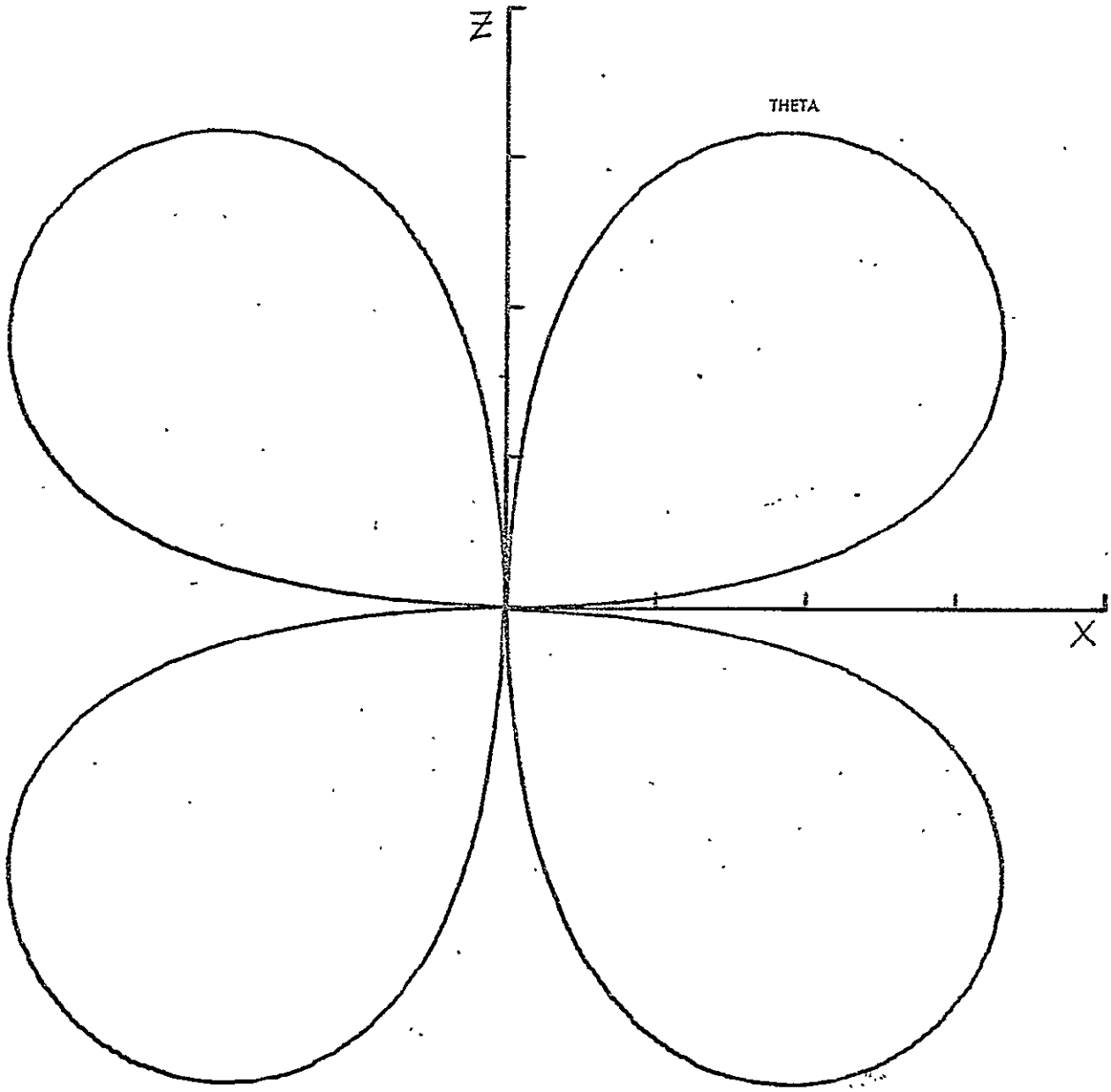

FIGURE D-8

FREQUENCY (MHZ) 4.70
V-ANT. LENGTH (FT) DIPOLE ALONE
MODE UNBALANCED
DB MAX +2.7
DB MIN -17.3

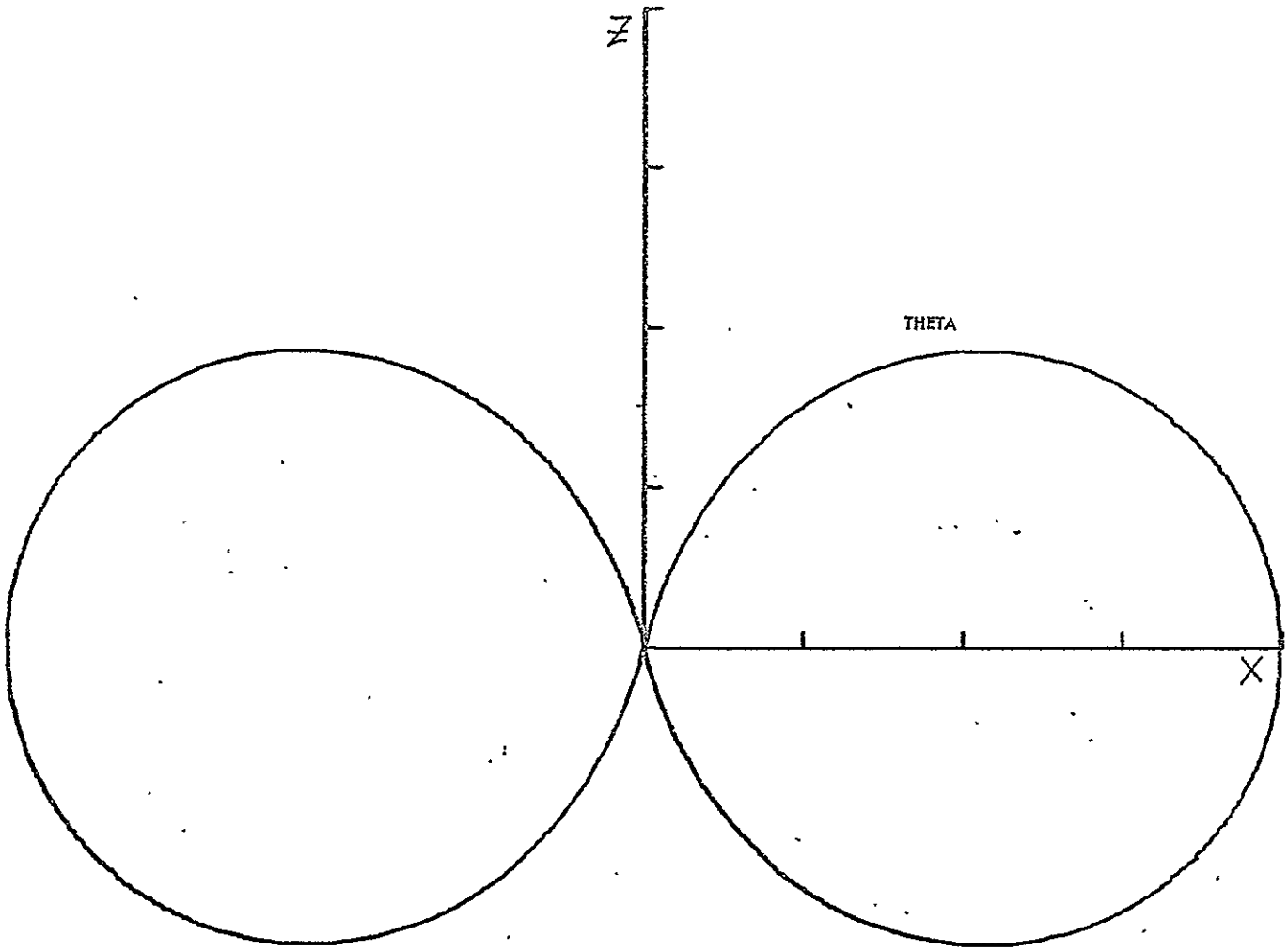

FIGURE D-9

FREQUENCY (MHZ) 6.55
V-ANT. LENGTH (FT) DIPOLE ALONE
MODE BALANCED
DB MAX +2.8
DB MIN -17.2

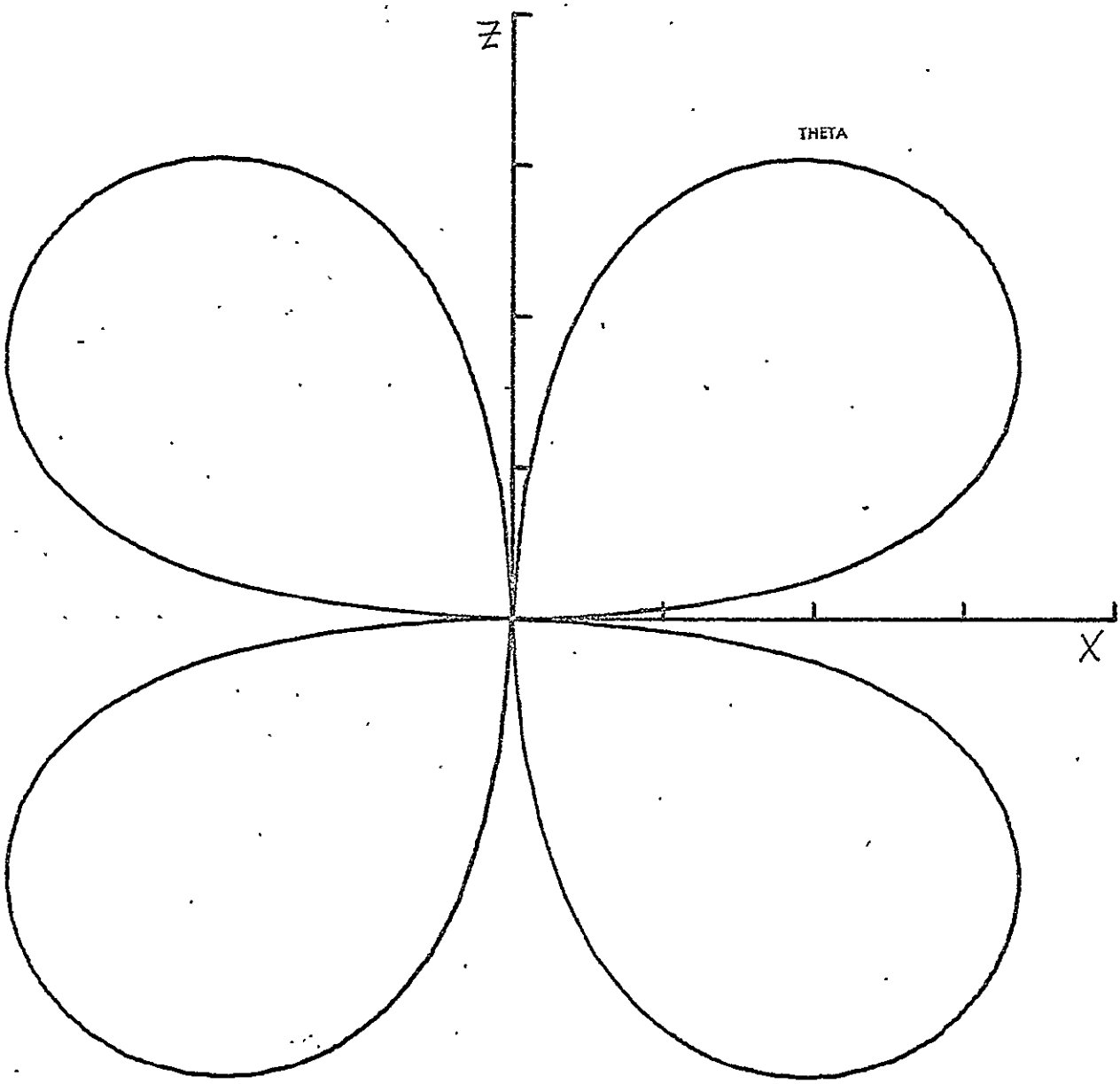

FIGURE D - 10

FREQUENCY (MHZ) 6.55
V-ANT. LENGTH (FT) DIPOLE ALONE
MODE UNBALANCED
DB MAX +2.8
DB MIN -17.2

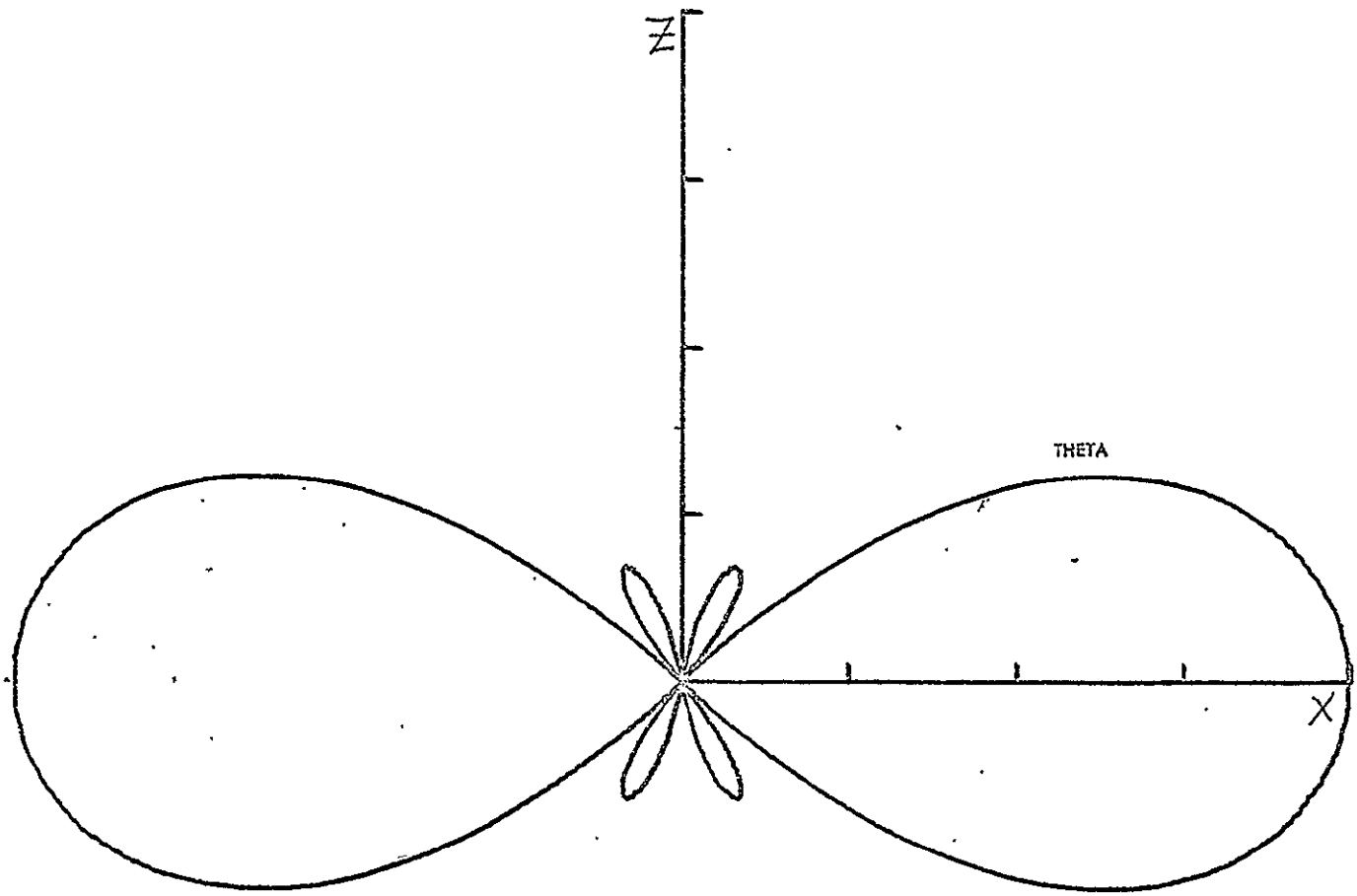

FIGURE D - 11

FREQUENCY (MHZ) 9.18
ANT. LENGTH (FT) DIPOLE ALONE
MODE BALANCED
DB MAX +4.4
DB MIN -15.6

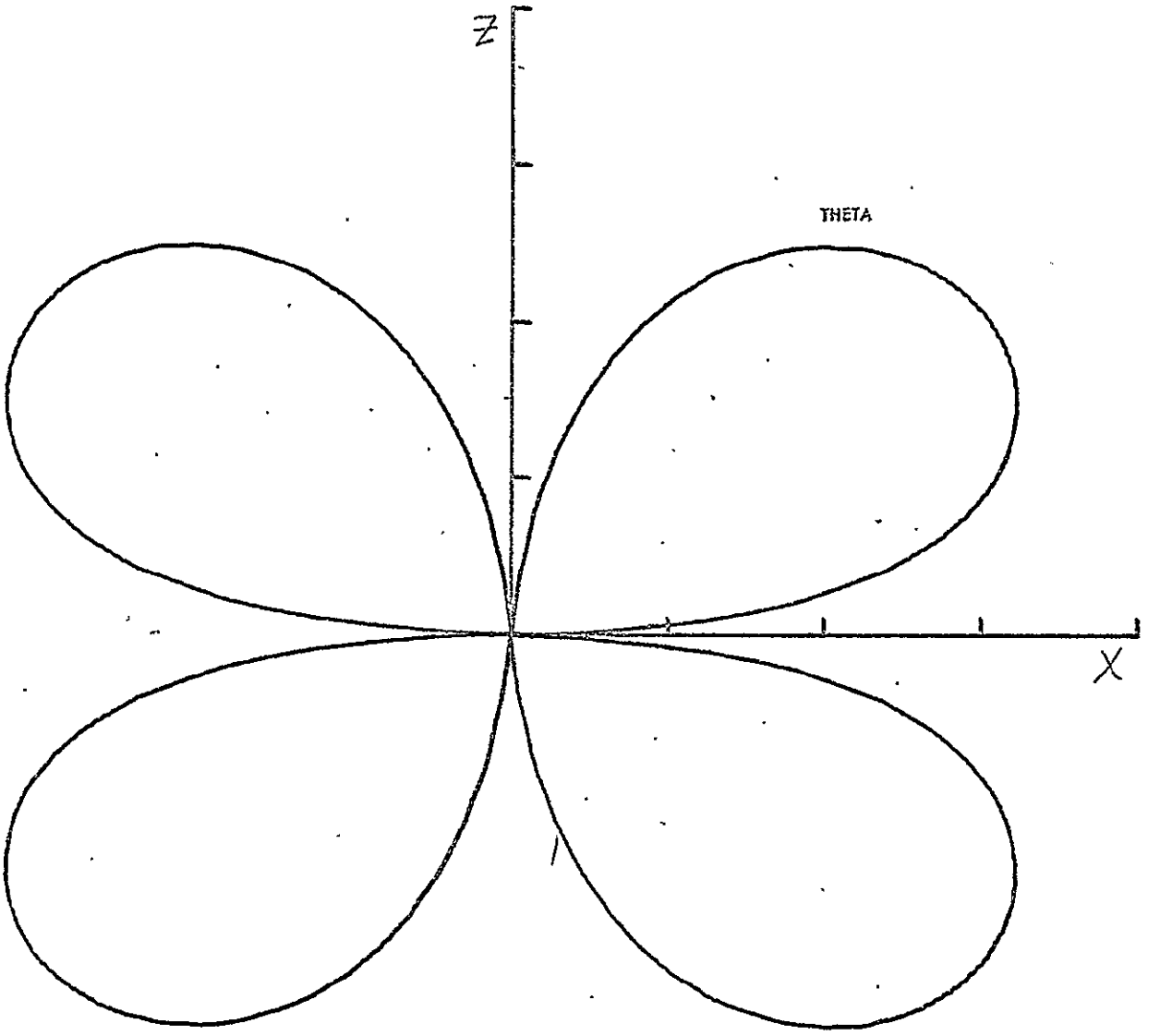

FIGURE D-12

FREQUENCY (MHZ) 9.18
V-ANT. LENGTH (FT) DIPOLE ALONE
MODE UNBALANCED
DB MAX +4.4
DB MIN -15.6

APPENDIX E

CURRENT DISTRIBUTIONS FOR ORTHOGONAL DIPOLES

See Appendix A for discussion

NOTE 1: Wires 1 through 6 represent the driven dipole, 7 through 9 the parasitic dipole.

NOTE 2: Excitation mode 1 in this listing is the unbalanced mode.

ANTENNA/SCATTERING PROGRAM WIRA

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TCI.2236 · NASA ORTHOGONAL DIPOLES INTERPOLATION SCHEME 1

NUMBER OF WIRES 9
THE X-Z PLANE IS A MAGNETIC PLANE
WIRE CONDUCTIVITY INFINITE

WIRE COORDINATES IN FEET AND WIRE RADII IN INCHES

WIRE NO		X1	Y1	Z1	RAD1	X2	Y2	Z2	RAD2	INTERVALS
1	GAP -1	-0.0000	-0.0000	-0.0000	.250000	-0.0000	-0.0000	5.0000	.250000	1
2		-0.0000	-0.0000	5.0000	.250000	-0.0000	-0.0000	15.0000	.250000	1
3		-0.0000	-0.0000	15.0000	.250000	-0.0000	-0.0000	61.5000	.250000	3
4	GAP 2	-0.0000	-0.0000	-0.0000	.250000	-0.0000	-0.0000	-5.0000	.250000	1
5		-0.0000	-0.0000	-5.0000	.250000	-0.0000	-0.0000	-15.0000	.250000	1
6		-0.0000	-0.0000	-15.0000	.250000	-0.0000	-0.0000	-61.5000	.250000	3
7	GAP 3	-0.0000	-0.0000	-0.0000	.250000	-0.0000	5.0000	-0.0000	.250000	1
8		-0.0000	5.0000	-0.0000	.250000	-0.0000	15.0000	-0.0000	.250000	1
9		-0.0000	15.0000	-0.0000	.250000	-0.0000	61.5000	-0.0000	.250000	3

E-1

FREQUENCY = 2.2000 MC

NO GROUND PRESENT

MAXIMUM RELATIVE ASYMMETRY IN THE ANTENNA ADMITTANCE MATRIX IS .0 PER CENT FOR GAPS 2 AND 1

EXCITATION MODE 1

GAP SOURCES

GAP	EMF VOLT	EMF DEGREES	OHM	MICRO HENRY	PICO FARAD	
1	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES
2	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES

		COORDINATES			CURRENT DISTRIBUTION						NORMAL ELECTRIC FIELD * RADIUS	
		X	Y	Z	AMPLITUDE			PHASE				
WIRE NO	INT NO	WAVE-LENGTHS	WAVE-LENGTHS	WAVE-LENGTHS	AMP	AMP	AMP	DEG	DEG	DEG	VOLTS	DEG
		0.0000	0.0000	-.0000	GAP 1			GAP 1			144.123	.0
1	1	0.0000	0.0000	.0056	1.3631	1.2850	1.2195	90.0	90.0	90.0	122.693	-.0
2	2	0.0000	0.0000	.0224	1.2316	1.1266	1.0241	90.0	90.0	90.0	88.758	-.0
3	3	0.0000	0.0000	.0509	1.0284	.8714	.7100	90.0	90.0	89.9	87.951	-.0
3	4	0.0000	0.0000	.0855	.7128	.5461	.3734	89.9	89.9	89.9	93.717	-.0
3	5	0.0000	0.0000	.1201	.3795	.1967	.0000	89.9	89.9	-90.3	104.797	-.1
		0.0000	0.0000	.0000	GAP 2			GAP 2			144.123	.0
4	6	0.0000	0.0000	-.0056	1.3631	1.2850	1.2195	90.0	90.0	90.0	122.693	-.0
5	7	0.0000	0.0000	-.0224	1.2316	1.1266	1.0241	90.0	90.0	90.0	88.758	-.0
6	8	0.0000	0.0000	-.0509	1.0284	.8714	.7100	90.0	90.0	89.9	87.951	-.0
6	9	0.0000	0.0000	-.0855	.7128	.5461	.3734	89.9	89.9	89.9	93.717	-.0
6	10	0.0000	0.0000	-.1201	.3795	.1967	.0000	89.9	89.9	-90.3	104.797	-.1
		0.0000	-.0000	0.0000	GAP 3			GAP 3			144.123	-180.0
7	11	0.0000	.0056	0.0000	1.3631	1.2850	1.2195	-90.0	-90.0	-90.0	122.693	180.0
8	12	0.0000	.0224	0.0000	1.2316	1.1266	1.0241	-90.0	-90.0	-90.0	88.758	180.0
9	13	0.0000	.0509	0.0000	1.0284	.8714	.7100	-90.0	-90.0	-90.1	87.951	180.0
9	14	0.0000	.0855	0.0000	.7128	.5461	.3734	-90.1	-90.1	-90.1	93.717	180.0
9	15	0.0000	.1201	0.0000	.3795	.1967	.0000	-90.1	-90.1	89.7	104.797	179.9

IMPEDANCE DATA

GAP NO	INPUT RESIST. OHMS	INPUT REACT. OHMS	INPUT CONDUCT. MHOS	INPUT SUSCEPT. MHOS	LOAD RESIST. OHMS	LOAD REACT. OHMS	GAP RESIST. OHMS	GAP REACT. OHMS	GAP VOLTAGE VOLT	GAP VOLTAGE DEGREES
1	.408	-733.652	.000001	.001363	0.000	0.000	.408	-733.652	1000.000	0.0
2	.408	-733.652	.000001	.001363	0.000	0.000	.408	-733.652	1000.000	0.0

INPUT POWER = 1.516 WATTS
RADIATED POWER = 1.516 WATTS
WIRE LOSS = .000 WATTS
NETWORK LOSS = 0.000 WATTS
RADIATION EFFICIENCY = 100.00 PER CENT

FREQUENCY = 2.8000 MC

NO GROUND PRESENT

MAXIMUM RELATIVE ASYMMETRY IN THE ANTENNA ADMITTANCE MATRIX IS .0 PER CENT FOR GAPS 2 AND 1

EXCITATION MODE 1

GAP SOURCES

GAP	EMF VOLT	EMF DEGREES	OHM	MICRO HENRY	PICO FARAD	
1	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES
2	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES

E-3

COORDINATES			CURRENT DISTRIBUTION						NORMAL ELECTRIC FIELD * RADIUS	
	X	Y	Z	AMPLITUDE			PHASE			
WIRE NO	INT NO	WAVE-LENGTHS	WAVE-LENGTHS	WAVE-LENGTHS	AMP	AMP	AMP	DEG	DEG	DEG	VOLTS	DEG
		0.0000	0.0000	-.0000	GAP 1			GAP 1			144.383	-.0
1	1	0.0000	0.0000	.0071	2.2008	2.1003	2.0140	89.8	89.8	89.8	125.411	-.0
2	2	0.0000	0.0000	.0284	2.0297	1.8848	1.7362	89.8	89.8	89.8	98.651	-.0
3	3	0.0000	0.0000	.0647	1.7421	1.5009	1.2396	89.8	89.8	89.8	109.175	-.1
3	4	0.0000	0.0000	.1088	1.2440	.9631	.6636	89.8	89.8	89.7	126.085	-.2
3	5	0.0000	0.0000	.1529	.6744	.3513	.0000	89.7	89.7	-90.8	146.528	-.3
		0.0000	0.0000	.0000	GAP 2			GAP 2			144.383	-.0
4	6	0.0000	0.0000	-.0071	2.2008	2.1003	2.0140	89.8	89.8	89.8	125.411	-.0
5	7	0.0000	0.0000	-.0284	2.0297	1.8848	1.7362	89.8	89.8	89.8	98.651	-.0
6	8	0.0000	0.0000	-.0647	1.7421	1.5009	1.2396	89.8	89.8	89.8	109.175	-.1
6	9	0.0000	0.0000	-.1088	1.2440	.9631	.6636	89.8	89.8	89.7	126.085	-.2
6	10	0.0000	0.0000	-.1529	.6744	.3513	.0000	89.7	89.7	-90.8	146.528	-.3
		0.0000	-.0000	0.0000	GAP 3			GAP 3			144.383	180.0
7	11	0.0000	.0071	0.0000	2.2008	2.1003	2.0140	-90.2	-90.2	-90.2	125.411	180.0
8	12	0.0000	.0284	0.0000	2.0297	1.8848	1.7362	-90.2	-90.2	-90.2	98.651	180.0
9	13	0.0000	.0647	0.0000	1.7421	1.5009	1.2396	-90.2	-90.2	-90.2	109.175	179.9

WIRE NO	INT NO	X WAVE-LENGTHS	Y WAVE-LENGTHS	Z WAVE-LENGTHS	AMPLITUDE AMP	AMP	AMP	PHASE DEG	DEG	DEG	VOLTS	DEG
9	14	0.0000	.1088	0.0000	1.2440	.9631	.6636	-90.2	-90.2	-90.3	126.085	179.8
9	15	0.0000	.1529	0.0000	.6744	.3513	.0000	-90.3	-90.3	89.2	146.528	179.7

IMPEDANCE DATA

GAP NO	INPUT RESIST. OHMS	INPUT REACT. OHMS	INPUT CONDUCT. MHOS	INPUT SUSCEPT. MHOS	LOAD RESIST. OHMS	LOAD REACT. OHMS	GAP RESIST. OHMS	GAP REACT. OHMS	GAP VOLTAGE VOLT	DEGREES
1	1.217	-454.389	.000006	.002201	0.000	0.000	1.217	-454.389	1000.000	0.0
2	1.217	-454.389	.000006	.002201	0.000	0.000	1.217	-454.389	1000.000	0.0

INPUT POWER = 11.787 WATTS
RADIATED POWER = 11.787 WATTS
WIRE LOSS = .000 WATTS
NETWORK LOSS = 0.000 WATTS
RADIATION EFFICIENCY = 100.00 PER CENT

FREQUENCY = 3.9300 MC

NO GROUND PRESENT

MAXIMUM RELATIVE ASYMMETRY IN THE ANTENNA ADMITTANCE MATRIX IS .0 PER CENT FOR GAPS 2 AND 1

EXCITATION MODE 1

GAP SOURCES

GAP	EMF VOLT	EMF DEGREES	OHM	MICRO HENRY	PICO FARAD	
1	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES
2	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES

WIRE NO	INT NO	COORDINATES X WAVE-LENGTHS	Y WAVE-LENGTHS	Z WAVE-LENGTHS	CURRENT DISTRIBUTION AMPLITUDE AMP	AMP	AMP	PHASE DEG	DEG	DEG	NORMAL ELECTRIC FIELD * RADIUS VOLTS	DEG
		0.0000	0.0000	-.0000	GAP 1			GAP 1			150.041	-.3
1	1	0.0000	0.0000	.0100	19.2405	19.0660	18.8540	82.4	82.3	82.3	185.657	-2.7
2	2	0.0000	0.0000	.0399	18.8808	18.3213	17.5173	82.3	82.2	82.1	327.119	-5.9
3	3	0.0000	0.0000	.0908	17.5372	15.8185	13.5468	82.1	82.0	82.0	619.651	-7.2
3	4	0.0000	0.0000	.1527	13.5829	10.8077	7.5975	81.9	81.8	81.8	929.372	-7.8
3	5	0.0000	0.0000	.2146	7.7216	4.0733	.0000	81.7	81.6	-100.4	1198.957	-8.3
		0.0000	0.0000	.0000	GAP 2			GAP 2			150.041	-.3
4	6	0.0000	0.0000	-.0100	19.2405	19.0660	18.8540	82.4	82.3	82.3	185.657	-2.7
5	7	0.0000	0.0000	-.0399	18.8808	18.3213	17.5173	82.3	82.2	82.1	327.119	-5.9
6	8	0.0000	0.0000	-.0908	17.5372	15.8185	13.5468	82.1	82.0	82.0	619.651	-7.2
6	9	0.0000	0.0000	-.1527	13.5829	10.8077	7.5975	81.9	81.8	81.8	929.372	-7.8
6	10	0.0000	0.0000	-.2146	7.7216	4.0733	.0000	81.7	81.6	-100.4	1198.957	-8.3
		0.0000	-.0000	0.0000	GAP 3			GAP 3			150.041	179.7
7	11	0.0000	.0100	0.0000	19.2405	19.0660	18.8540	-97.6	-97.7	-97.7	185.657	177.3
8	12	0.0000	.0399	0.0000	18.8808	18.3213	17.5173	-97.7	-97.8	-97.9	327.119	174.1
9	13	0.0000	.0908	0.0000	17.5372	15.8185	13.5468	-97.9	-98.0	-98.0	619.651	172.8
9	14	0.0000	.1527	0.0000	13.5829	10.8077	7.5975	-98.1	-98.2	-98.2	929.372	172.2
9	15	0.0000	.2146	0.0000	7.7216	4.0733	.0000	-98.3	-98.4	79.6	1198.957	171.7

IMPEDANCE DATA

GAP NO	INPUT RESIST. OHMS	INPUT REACT. OHMS	INPUT CONDUCT. MHOS	INPUT SUSCEPT. MHOS	LOAD RESIST. OHMS	LOAD REACT. OHMS	GAP RESIST. OHMS	GAP REACT. OHMS	GAP VOLTAGE VOLT	DEGREES
1	6.894	-51.515	.002552	.019070	0.000	0.000	6.894	-51.515	1000.000	0.0
2	6.894	-51.515	.002552	.019070	0.000	0.000	6.894	-51.515	1000.000	0.0

INPUT POWER = 5104.201 WATTS
RADIATED POWER = 5104.201 WATTS
WIRE LOSS = .000 WATTS
NETWORK LOSS = 0.000 WATTS
RADIATION EFFICIENCY = 100.00 PER CENT

GRAPHIC NOT REPRODUCIBLE

FREQUENCY = 4.7000 MC

NO GROUND PRESENT

MAXIMUM RELATIVE ASYMMETRY IN THE ANTENNA ADMITTANCE MATRIX IS .0 PER CENT FOR GAPS 2 AND 1

EXCITATION MODE 1

GAP SOURCES

GAP	EMF VOLT	EMF DEGREES	OHM	MICRO HENRY	PICO FARAD	
1	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES
2	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES

WIRE NO	INT NO	COORDINATES X WAVELENGTHS	Y WAVELENGTHS	Z WAVELENGTHS	CURRENT DISTRIBUTION AMPLITUDE			PHASE			NORMAL ELECTRIC FIELD * RADIUS VOLTS	DEG
					AMP	AMP	AMP	DEG	DEG	DEG		
		0.0000	0.0000	-.0000	GAP 1			GAP 1			142.278	-.1
1	1	0.0000	0.0000	.0119	4.2263	4.3786	4.4809	-84.9	-85.1	-85.2	102.462	-.9
2	2	0.0000	0.0000	.0478	4.4568	4.5331	4.5015	-85.2	-85.4	-85.6	10.969	-30.6
3	3	0.0000	0.0000	.1086	4.4968	4.2416	3.7575	-85.6	-85.8	-86.1	96.354	-173.1
3	4	0.0000	0.0000	.1827	3.7646	3.0706	2.1970	-86.1	-86.3	-86.5	204.105	-175.5
3	5	0.0000	0.0000	.2567	2.2329	1.1907	.0000	-86.6	-86.8	-87.9	290.692	-176.6
		0.0000	0.0000	.0000	GAP 2			GAP 2			142.278	-.1
4	6	0.0000	0.0000	-.0119	4.2263	4.3786	4.4809	-84.9	-85.1	-85.2	102.462	-.9
5	7	0.0000	0.0000	-.0478	4.4568	4.5331	4.5015	-85.2	-85.4	-85.6	10.969	-30.6
6	8	0.0000	0.0000	-.1086	4.4968	4.2416	3.7575	-85.6	-85.8	-86.1	96.354	-173.1
6	9	0.0000	0.0000	-.1827	3.7646	3.0706	2.1970	-86.1	-86.3	-86.5	204.105	-175.5
6	10	0.0000	0.0000	-.2567	2.2329	1.1907	.0000	-86.6	-86.8	-87.9	290.692	-176.6
		0.0000	-.0000	0.0000	GAP 3			GAP 3			142.278	179.9
7	11	0.0000	.0119	0.0000	4.2263	4.3786	4.4809	95.1	94.9	94.8	102.462	179.1
8	12	0.0000	.0478	0.0000	4.4568	4.5331	4.5015	94.8	94.6	94.4	10.969	149.4
9	13	0.0000	.1086	0.0000	4.4968	4.2416	3.7575	94.4	94.2	93.9	96.354	6.9

WIRE NO	INT NO	X WAVE-LENGTHS	Y WAVE-LENGTHS	Z WAVE-LENGTHS	AMPLITUDE AMP	AMP	AMP	PHASE DEG	DEG	DEG	VOLTS	DEG
9	14	0.0000	.1827	0.0000	3.7646	3.0706	2.1970	93.9	93.7	93.5	204.105	4.5
9	15	0.0000	.2567	0.0000	2.2329	1.1907	.0000	93.4	93.2	92.1	290.692	3.4

IMPEDANCE DATA

GAP NO	INPUT RESIST. OHMS	INPUT REACT. OHMS	INPUT CONDUCT. MHOS	INPUT SUSCEPT. MHOS	LOAD RESIST. OHMS	LOAD REACT. OHMS	GAP RESIST. OHMS	GAP REACT. OHMS	GAP VOLTAGE VOLT	DEGREES
1	21.164	235.666	.000378	-.004209	0.000	0.000	21.164	235.666	1000.000	0.0
2	21.164	235.666	.000378	-.004209	0.000	0.000	21.164	235.666	1000.000	0.0

INPUT POWER = 756.046 WATTS
RADIATED POWER = 756.046 WATTS
WIRE LOSS = .000 WATTS
NETWORK LOSS = 0.000 WATTS
RADIATION EFFICIENCY = 100.00 PER CENT

FREQUENCY = 6.5500 MC

NO GROUND PRESENT

MAXIMUM RELATIVE ASYMMETRY IN THE ANTENNA ADMITTANCE MATRIX IS .0 PER CENT FOR GAPS 2 AND 1

EXCITATION MODE 1

GAP SOURCES

GAP	EMF VOLT	EMF DEGREES	OHM	MICRO HENRY	PICO FARAD	
1	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES
2	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES

GRAPHIC NOT REPRODUCIBLE

WIRE NO	INT NO	COORDINATES X WAVELENGTHS	COORDINATES Y WAVELENGTHS	COORDINATES Z WAVELENGTHS	CURRENT DISTRIBUTION AMPLITUDE			CURRENT DISTRIBUTION PHASE			NORMAL ELECTRIC FIELD * RADIUS VOLTS	NORMAL ELECTRIC FIELD * RADIUS DEG
		0.0000	0.0000	-.0000	GAP 1			GAP 1			143.740	-.0
1	1	0.0000	0.0000	.0166	.4162	.6340	.8098	-69.4	-76.7	-79.8	117.130	-.4
2	2	0.0000	0.0000	.0665	.7741	1.0161	1.1960	-79.3	-82.3	-84.0	62.041	-2.6
3	3	0.0000	0.0000	.1514	1.1848	1.3329	1.3296	-84.0	-85.7	-86.9	14.905	-19.2
3	4	0.0000	0.0000	.2545	1.3285	1.1748	.8874	-87.0	-87.9	-88.7	41.683	-173.5
3	5	0.0000	0.0000	.3577	.9014	.4958	.0000	-88.8	-89.5	-79.3	84.931	-178.8
		0.0000	0.0000	.0000	GAP 2			GAP 2			143.740	-.0
4	6	0.0000	0.0000	-.0166	.4162	.6340	.8098	-69.4	-76.7	-79.8	117.130	-.4
5	7	0.0000	0.0000	-.0665	.7741	1.0161	1.1960	-79.3	-82.3	-84.0	62.041	-2.6
6	8	0.0000	0.0000	-.1514	1.1848	1.3329	1.3296	-84.0	-85.7	-86.9	14.905	-19.2
6	9	0.0000	0.0000	-.2545	1.3285	1.1748	.8874	-87.0	-87.9	-88.7	41.683	-173.5
6	10	0.0000	0.0000	-.3577	.9014	.4958	.0000	-88.8	-89.5	-79.3	84.931	-178.8
		0.0000	-.0000	0.0000	GAP 3			GAP 3			143.740	180.0
7	11	0.0000	.0166	0.0000	.4162	.6340	.8098	110.6	103.3	100.2	117.130	179.6
8	12	0.0000	.0665	0.0000	.7741	1.0161	1.1960	100.7	97.7	96.0	62.041	177.4
9	13	0.0000	.1514	0.0000	1.1848	1.3329	1.3296	96.0	94.3	93.1	14.905	160.8
9	14	0.0000	.2545	0.0000	1.3285	1.1748	.8874	93.0	92.1	91.3	41.683	6.5
9	15	0.0000	.3577	0.0000	.9014	.4958	.0000	91.2	90.5	100.7	84.931	1.2

IMPEDANCE DATA

GAP NO	INPUT RESIST. OHMS	INPUT REACT. OHMS	INPUT CONDUCT. MHOS	INPUT SUSCEPT. MHOS	LOAD RESIST. OHMS	LOAD REACT. OHMS	GAP RESIST. OHMS	GAP REACT. OHMS	GAP VOLTAGE VOLT	GAP VOLTAGE DEGREES
1	845.703	2248.992	.000146	-.000390	0.000	0.000	845.703	2248.992	1000.000	0.0
2	845.703	2248.992	.000146	-.000390	0.000	0.000	845.703	2248.992	1000.000	0.0

INPUT POWER = 292.976 WATTS
RADIATED POWER = 292.976 WATTS
WIRE LOSS = .000 WATTS
NETWORK LOSS = 0.000 WATTS
RADIATION EFFICIENCY = 100.00 PER CENT

FREQUENCY = 9.1800 MC

NO GROUND PRESENT

MAXIMUM RELATIVE ASYMMETRY IN THE ANTENNA ADMITTANCE MATRIX IS .0 PER CENT FOR GAPS 2 AND 1

EXCITATION MODE 1

GAP SOURCES

GAP	EMF VOLT	EMF DEGREES	OHM	MICRO HENRY	PICO FARAD	
1	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES
2	1000.0000	-0.00	-0.0000	-0.0000	INFINITY	SERIES

WIRE NO	INT NO	COORDINATES X WAVELENGTHS	Y WAVELENGTHS	Z WAVELENGTHS	CURRENT DISTRIBUTION AMPLITUDE AMP	AMP	AMP	PHASE DEG	DEG	DEG	NORMAL ELECTRIC FIELD * RADIUS VOLTS	DEG
		0.0000	0.0000	-.0000	GAP 1			GAP 1			144.858	-.1
1	1	0.0000	0.0000	.0233	1.1181	.8027	.5451	73.8	67.4	56.6	127.182	-1.1
2	2	0.0000	0.0000	.0933	.5910	.2730	.4433	59.5	9.7	-59.9	93.068	-5.0
3	3	0.0000	0.0000	.2122	.4237	.9083	1.2257	-58.8	-81.9	-88.4	60.335	-12.1
3	4	0.0000	0.0000	.3568	1.2168	1.2750	1.0641	-88.5	-91.8	-94.0	12.815	-145.7
3	5	0.0000	0.0000	.5013	1.0793	.6241	.0000	-94.0	-95.7	78.5	73.803	176.0
		0.0000	0.0000	.0000	GAP 2			GAP 2			144.858	-.1
4	6	0.0000	0.0000	-.0233	1.1181	.8027	.5451	73.8	67.4	56.6	127.182	-1.1
5	7	0.0000	0.0000	-.0933	1.5910	.2730	.4433	59.5	9.7	-59.9	93.068	-5.0
6	8	0.0000	0.0000	-.2122	.4237	.9083	1.2257	-58.8	-81.9	-88.4	60.335	-12.1
6	9	0.0000	0.0000	-.3568	1.2168	1.2750	1.0641	-88.5	-91.8	-94.0	12.815	-145.7
6	10	0.0000	0.0000	-.5013	1.0793	.6241	.0000	-94.0	-95.7	78.5	73.803	176.0
		0.0000	-.0000	0.0000	GAP 3			GAP 3			144.858	179.9
7	11	0.0000	.0233	0.0000	1.1181	.8027	.5451	-106.2	-112.6	-123.4	127.182	178.9
8	12	0.0000	.0933	0.0000	.5910	.2730	.4433	-120.5	-170.3	120.1	93.068	175.0
9	13	0.0000	.2122	0.0000	.4237	.9083	1.2257	121.2	98.1	91.6	60.335	167.9

WIRE NO	INT NO	X WAVE-LENGTHS	Y WAVE-LENGTHS	Z WAVE-LENGTHS	AMPLITUDE X AMP	AMPLITUDE Y AMP	AMPLITUDE Z AMP	PHASE X DEG	PHASE Y DEG	PHASE Z DEG	VOLTS	DEG
9	14	0.0000	.3568	0.0000	1.2168	1.2750	1.0641	91.5	88.2	86.0	12.815	34.3
9	15	0.0000	.5013	0.0000	1.0793	.6241	.0000	86.0	84.3	-101.5	73.803	-4.0

IMPEDANCE DATA

GAP NO	INPUT RESIST. OHMS	INPUT REACT. OHMS	INPUT CONDUCT. MHOS	INPUT SUSCEPT. MHOS	LOAD RESIST. OHMS	LOAD REACT. OHMS	GAP RESIST. OHMS	GAP REACT. OHMS	GAP VOLTAGE VOLT	GAP VOLTAGE DEGREES
1	249.666	-858.799	.000312	.001074	0.000	0.000	249.666	-858.799	1000.000	0.0
2	249.666	-858.799	.000312	.001074	0.000	0.000	249.666	-858.799	1000.000	0.0

INPUT POWER = 624.268 WATTS
RADIATED POWER = 624.268 WATTS
WIRE LOSS = .000 WATTS
NETWORK LOSS = 0.000 WATTS
RADIATION EFFICIENCY = 100.00 PER CENT

GRAPHIC NOT REPRODUCIBLE

APPENDIX F

RADIATION PATTERNS FOR ORTHOGONAL DIPOLES

Patterns in two principal planes are sufficient. See Appendix B for further discussion.

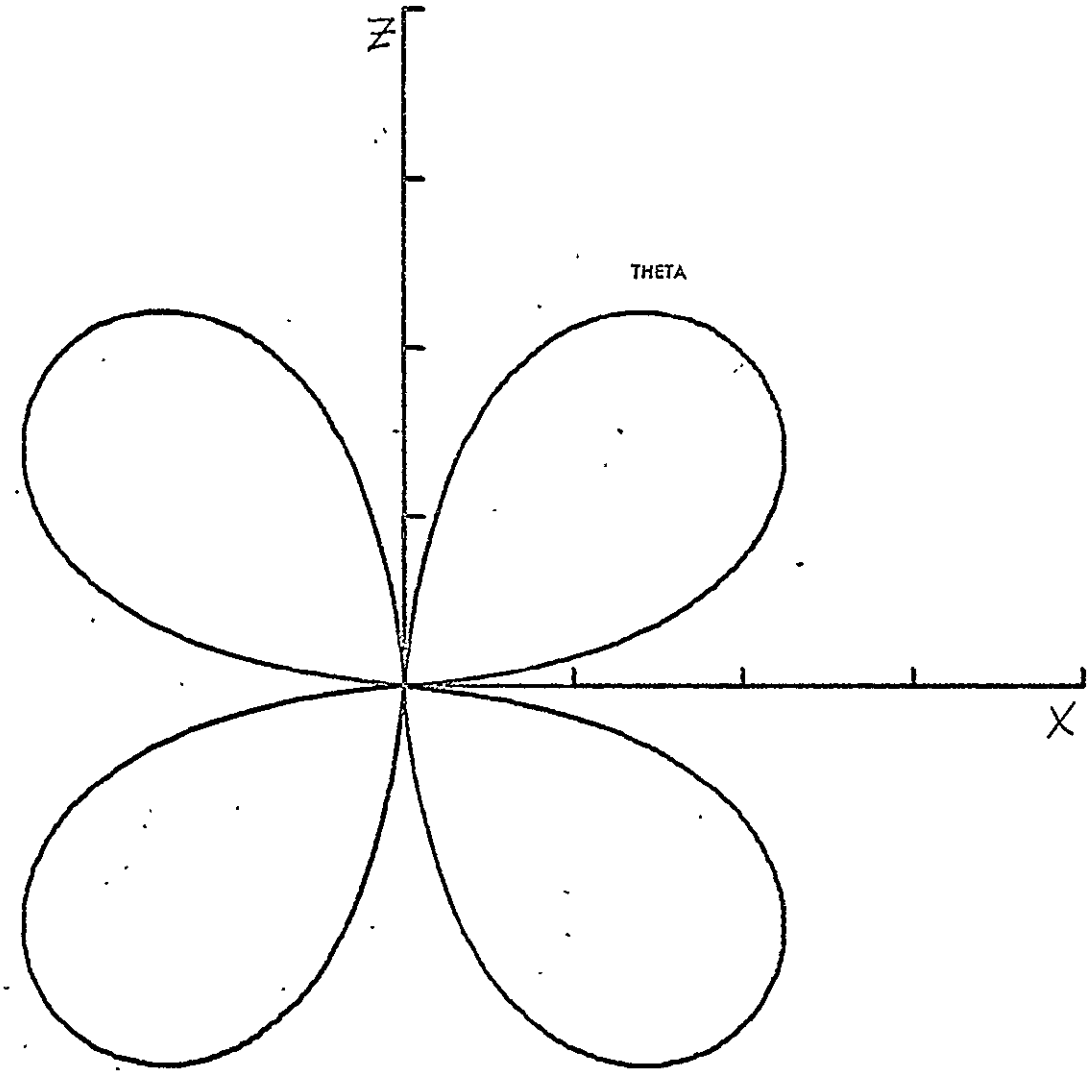

FIGURE F - 1

FREQUENCY (MHZ) .202 - 2.20
V-ANT. LENGTH (FT) ORTHO. DIPOLES
MODE UNBALANCED
DB MAX +3.7
DB MIN -16.3

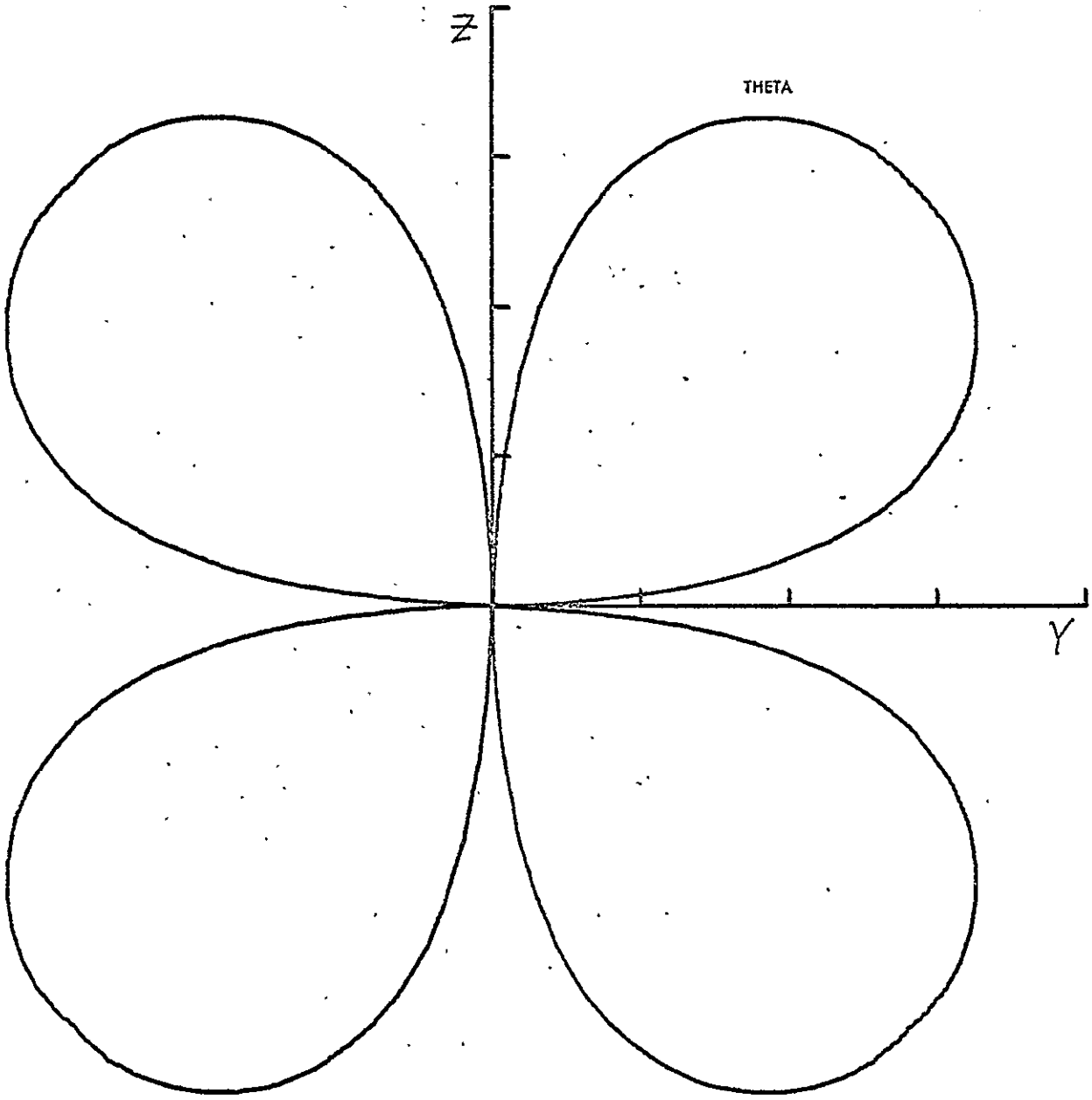

FIGURE F-2

FREQUENCY (MHZ) .202 - 2.20
Y-ANT. LENGTH (FT) ORTHO. DIPOLES
MODE UNBALANCED
DB MAX +3.7
DB MIN -16.3

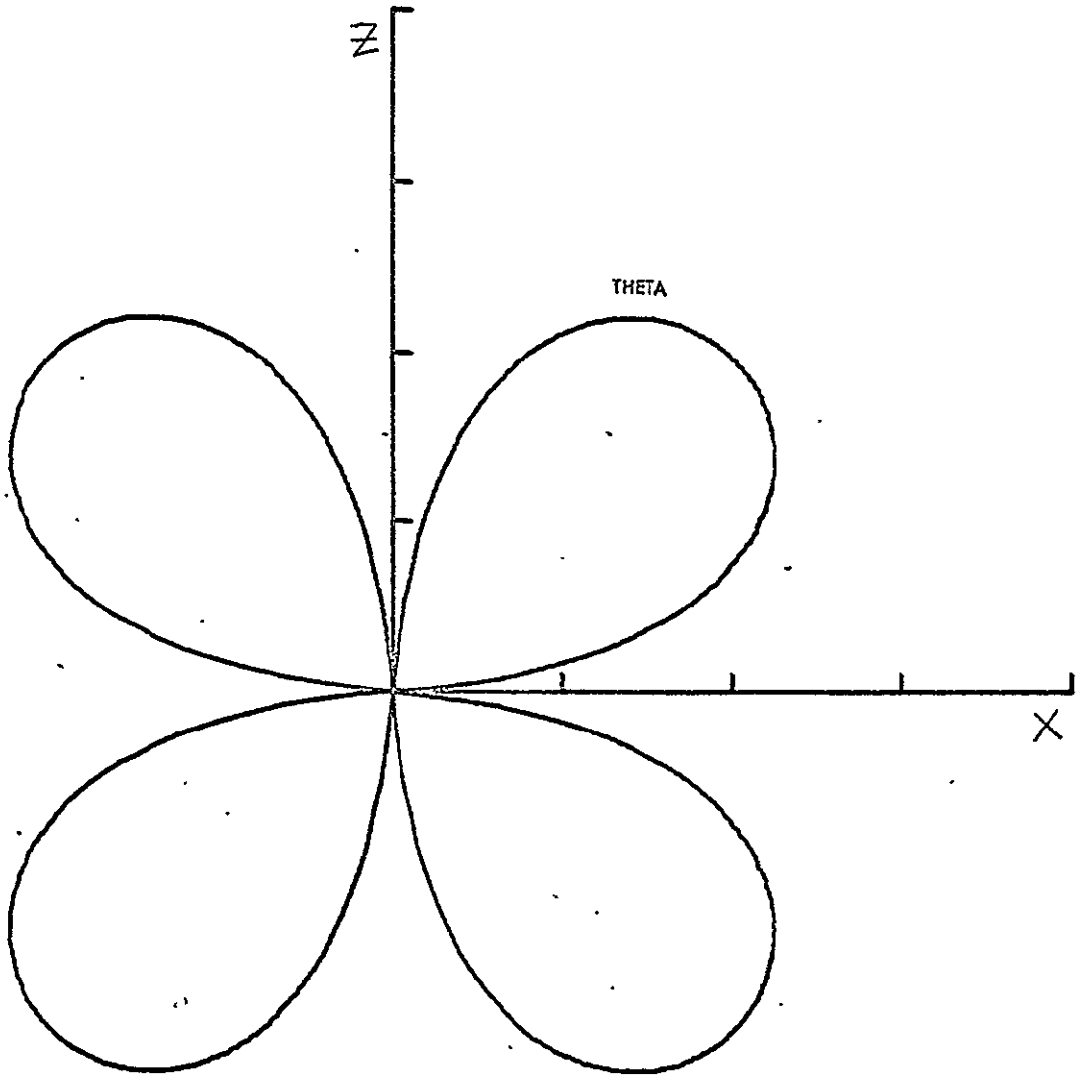

FIGURE F - 3

FREQUENCY (MHZ) 2.80
V-ANT. LENGTH (FT) ORTHO. DIPOLES
MODE UNBALANCED
DB MAX +3.6
DB MIN -16.4

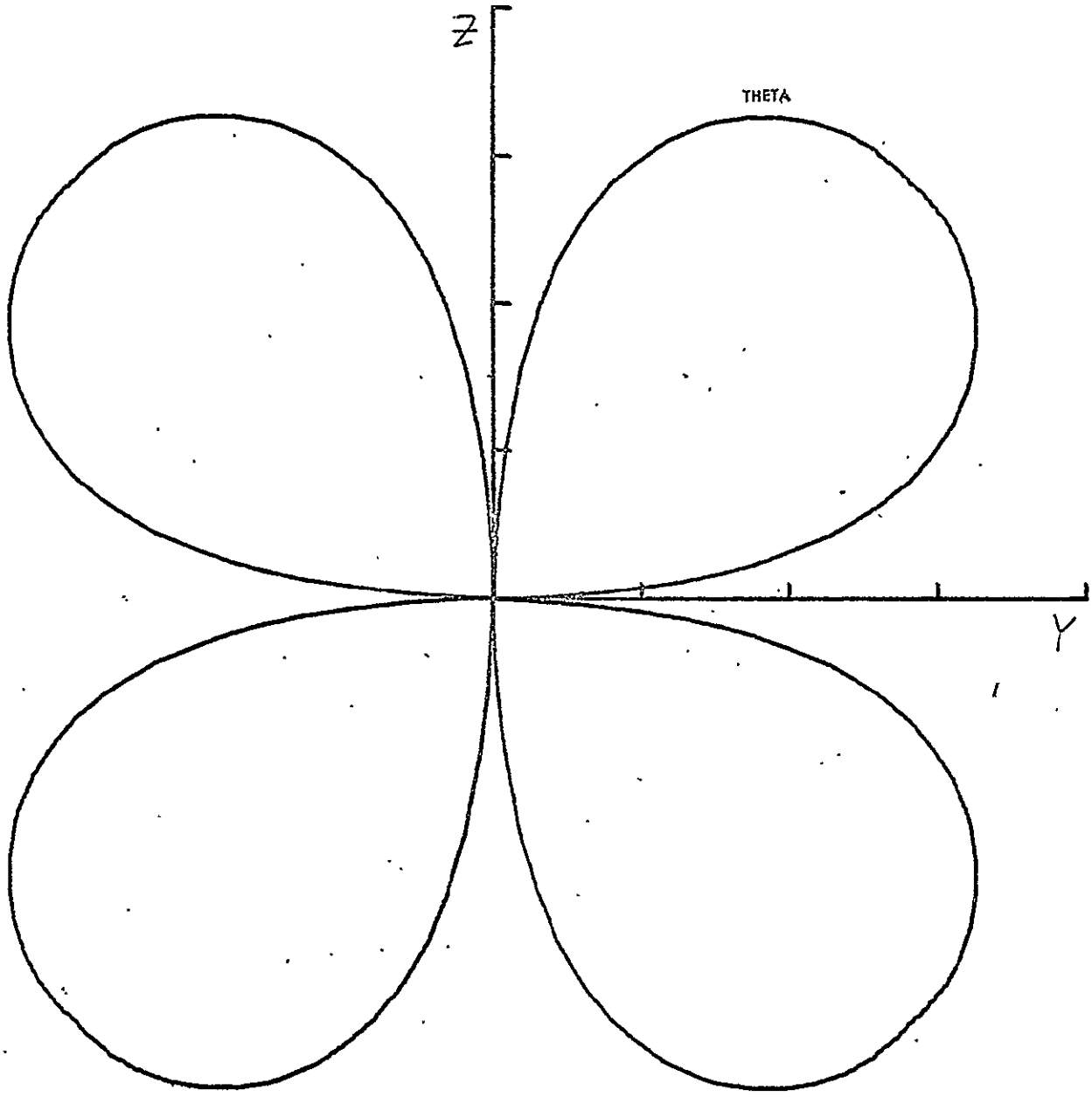

FIGURE F-4

FREQUENCY (MHZ) 2.80
V-ANT. LENGTH (FT) ORTHO. DIPOLES
MODE UNBALANCED
DB MAX +3.6
DB MIN -16.4

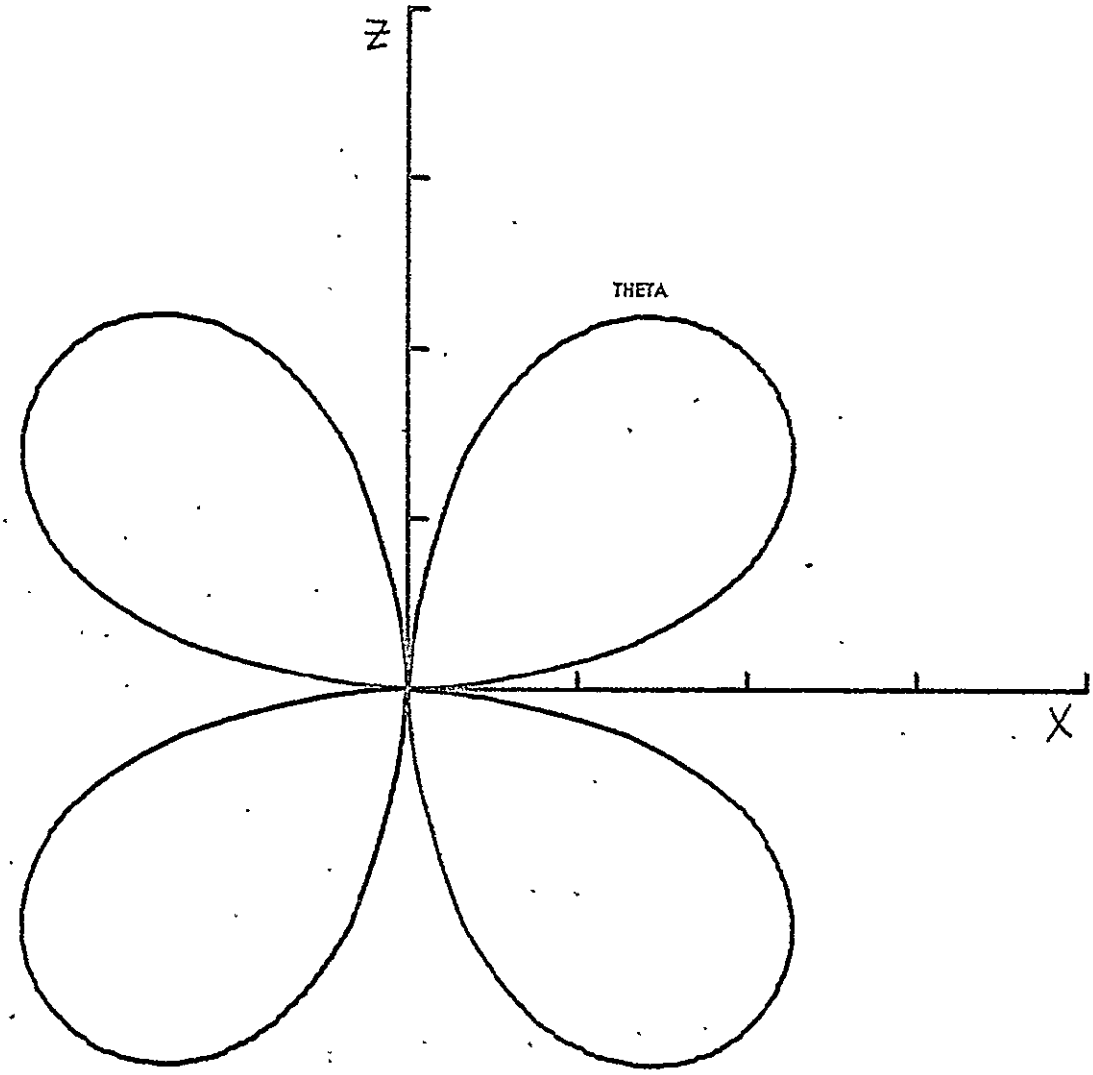

FIGURE F-5

FREQUENCY (MHZ) 3.93
Y-ANT. LENGTH (FT) ORTHO. DIPOLES
MODE UNBALANCED
DB MAX +3.6
DB MIN -16.4

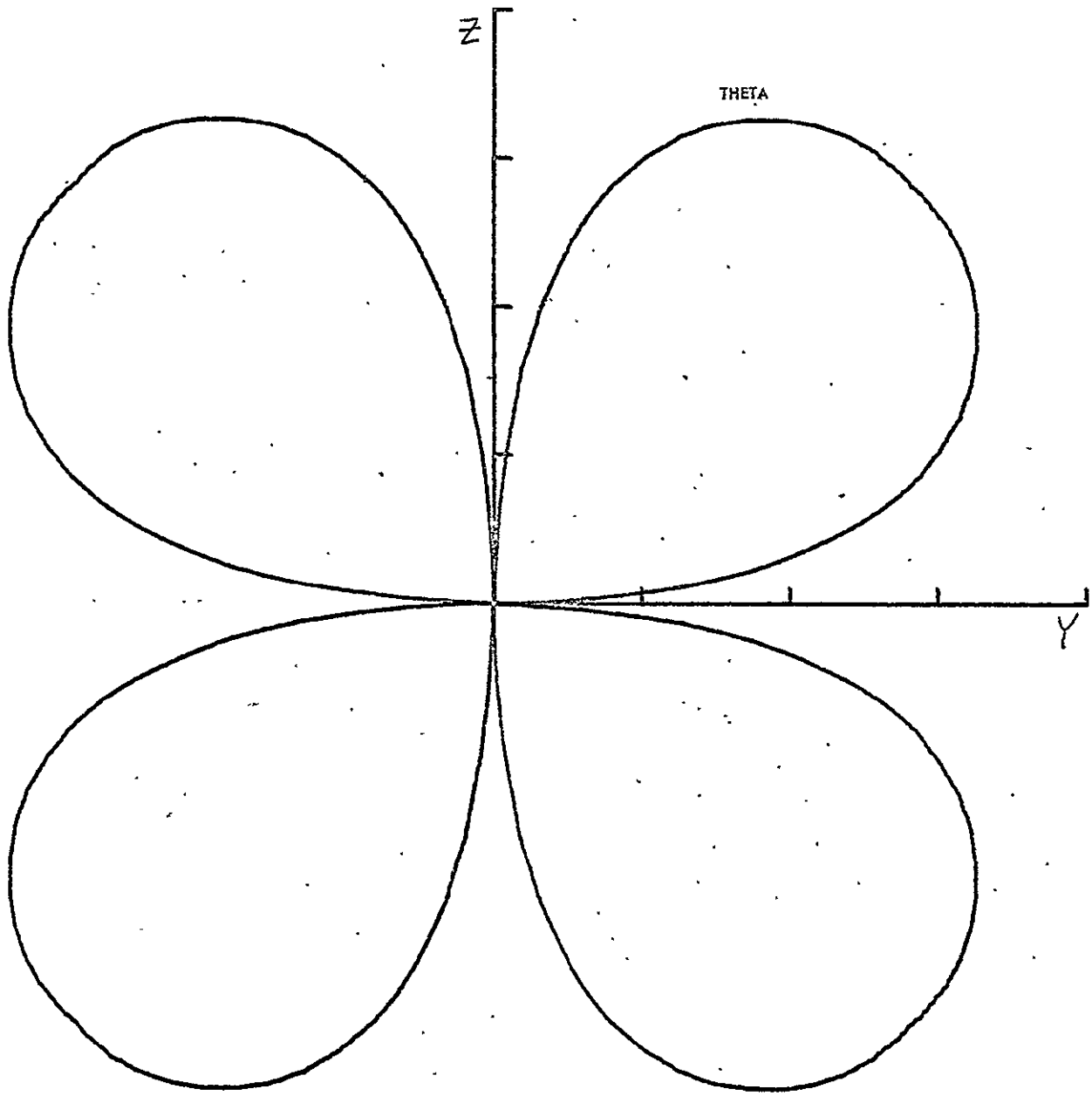

FIGURE F - 6

FREQUENCY (MHZ) 3.93
V-ANT. LENGTH (FT) ORTHO. DIPOLES
MODE UNBALANCED
DB MAX +3.6
DB MIN -16.4

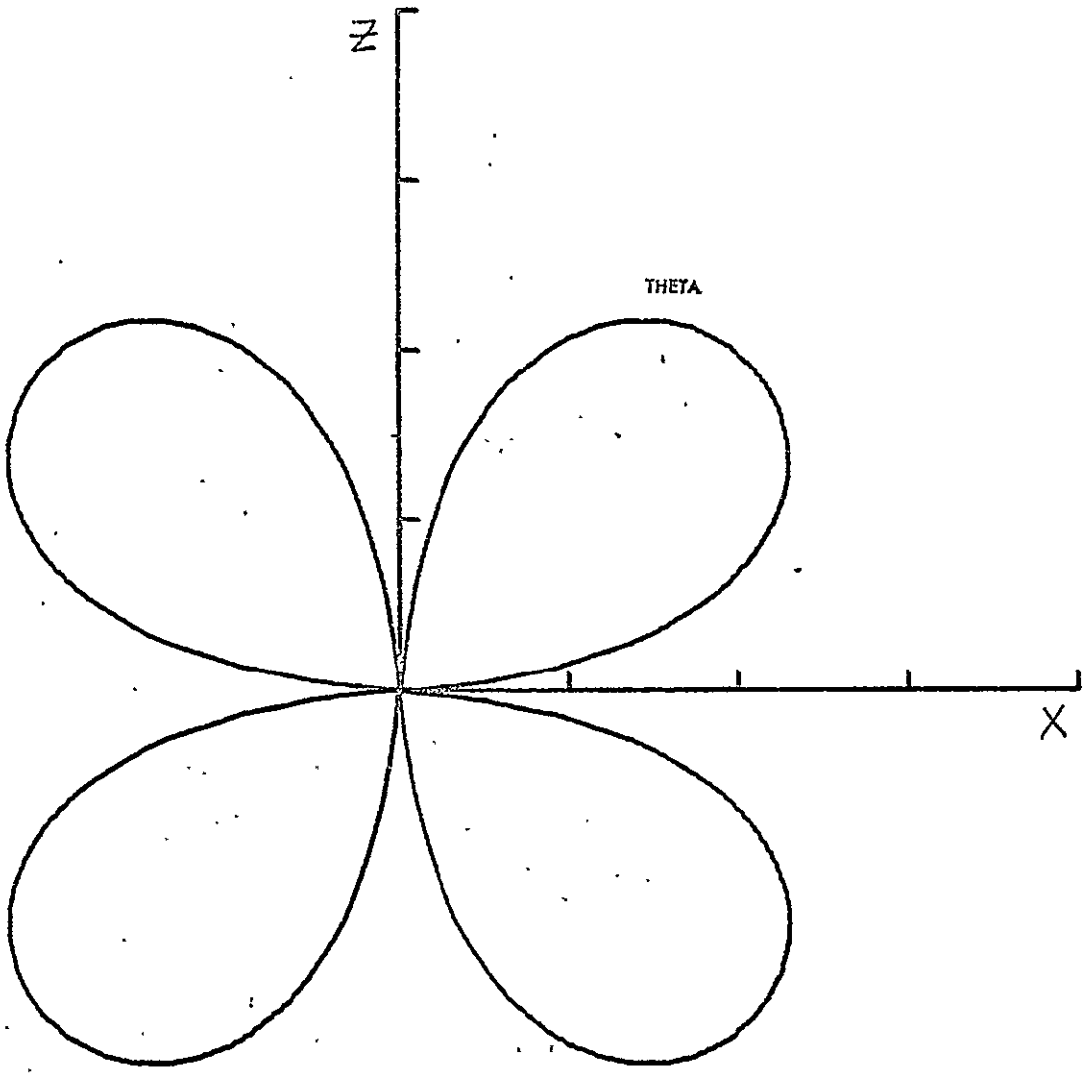

FIGURE F-7

FREQUENCY (MHZ) 4.70
V-ANT. LENGTH (FT) ORTHO. DIPOLES
MODE UNBALANCED
DB MAX +3.5
DB MIN -16.5

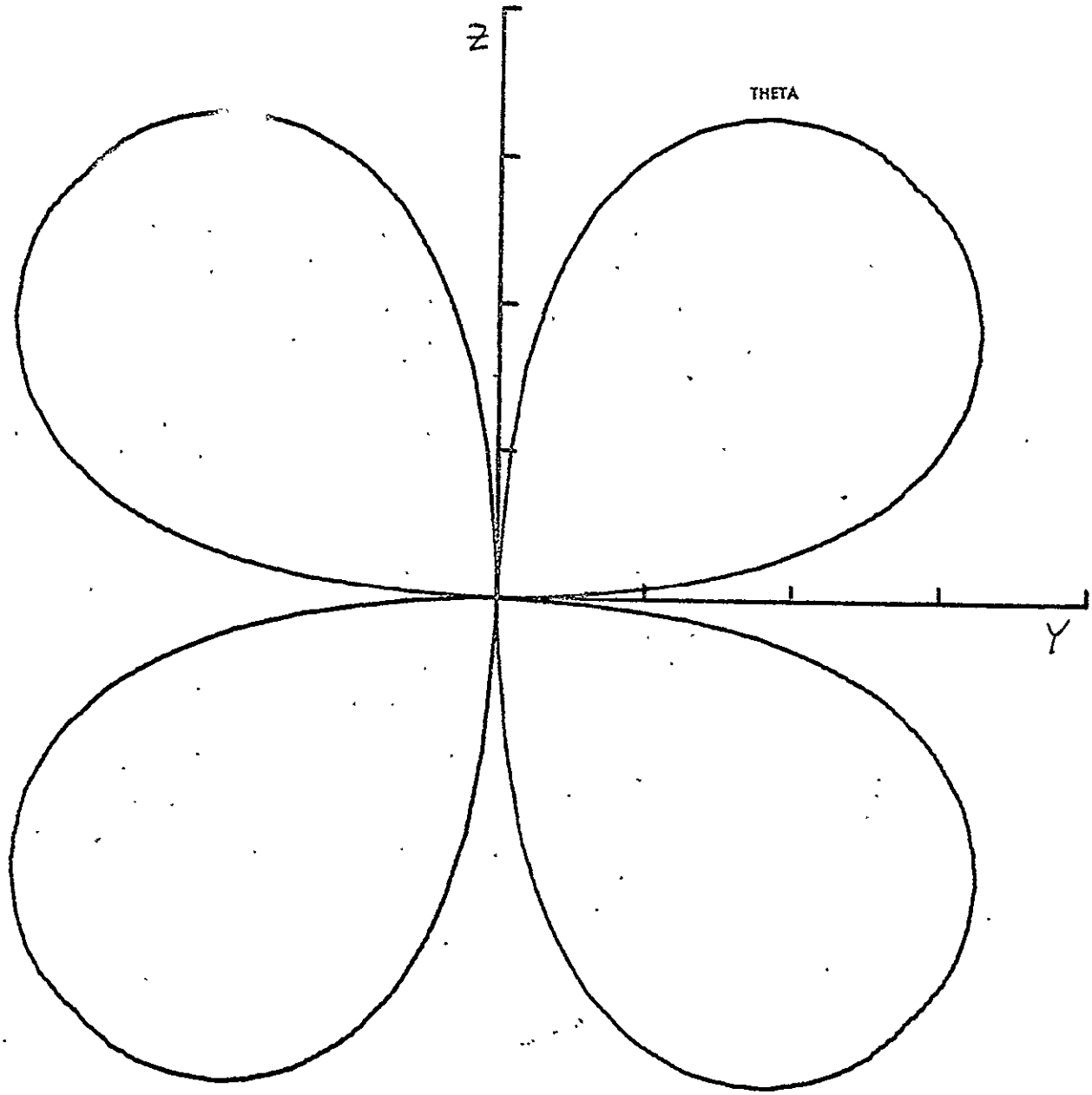

FIGURE F - 8

FREQUENCY (MHZ) 4.70
V-ANT. LENGTH (FT) ORTHO. DIPOLES
MODE UNBALANCED
DB MAX +3.5
DB MIN -16.5

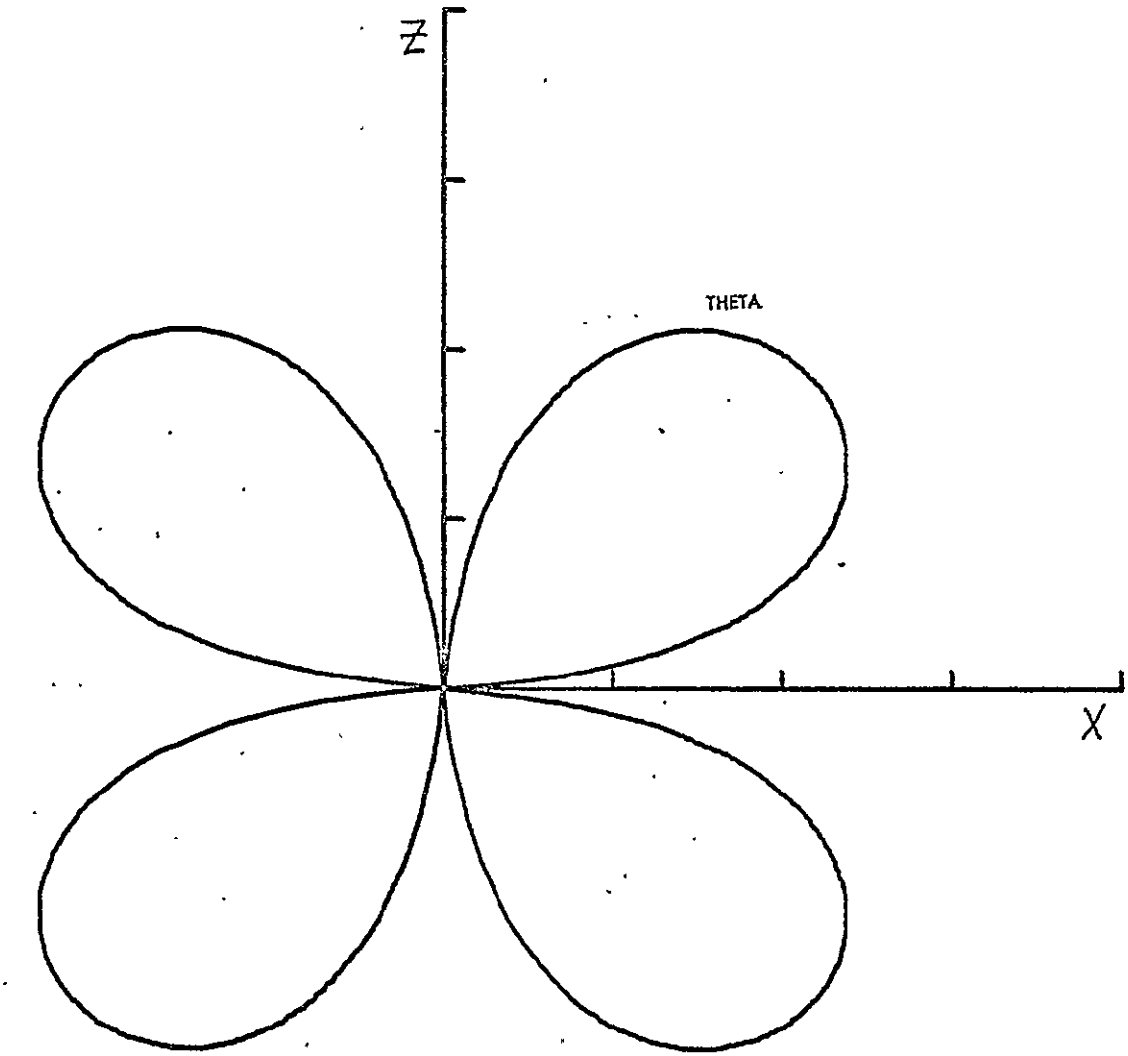

FIGURE F-9

FREQUENCY (MHZ) 6.55
V-ANT. LENGTH (FT) ORTHO. DIPOLES
MODE UNBALANCED
DB MAX +3.3
DB MIN -16.7

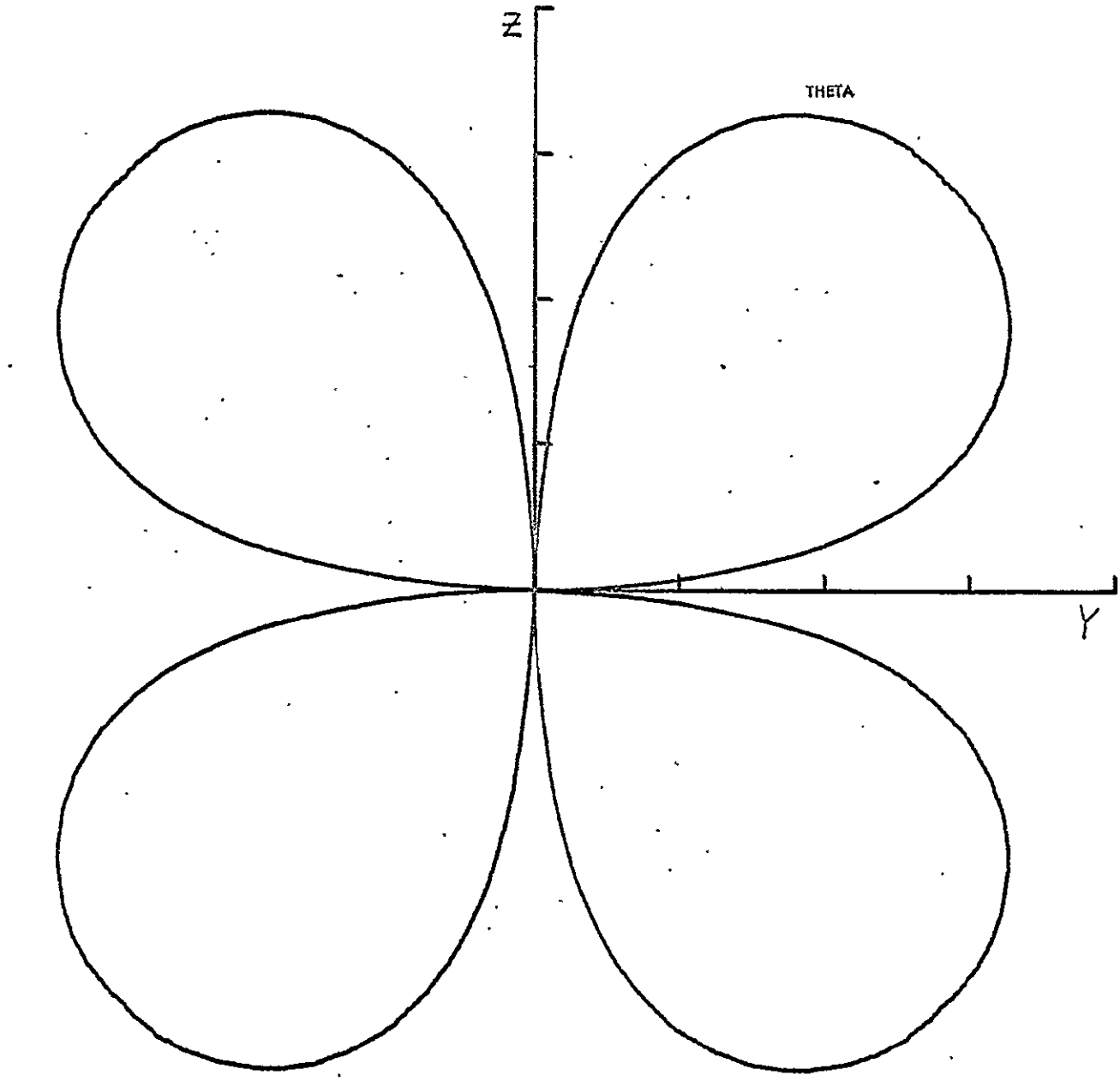

FIGURE F-10

FREQUENCY (MHZ) 6.55
V-ANT. LENGTH (FT) ORTHO. DIPOLES
MODE UNBALANCED
DB MAX +3.3
DB MIN -16.7

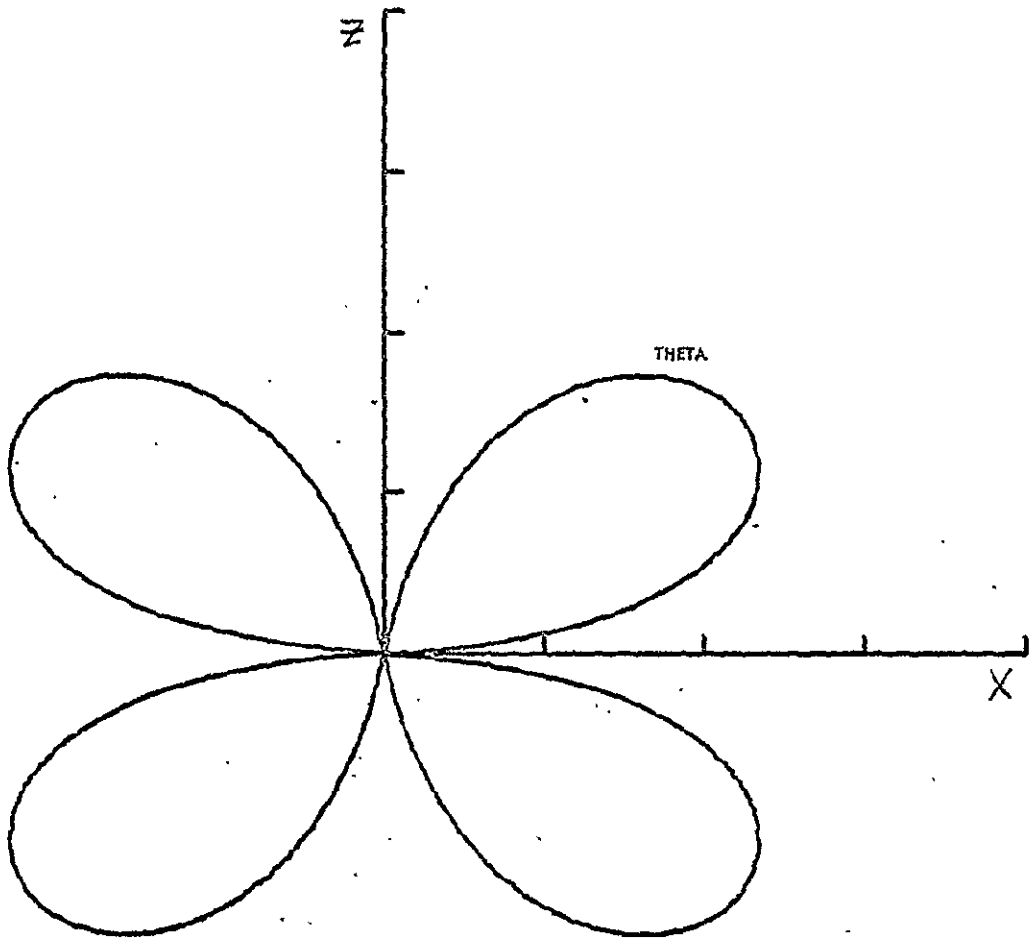

FIGURE F-11

FREQUENCY (MHZ) 9.18
V-ANT. LENGTH (FT) ORTHO. DIPOLES
MODE UNBALANCED
DB MAX +4.4
DB MIN -15.6

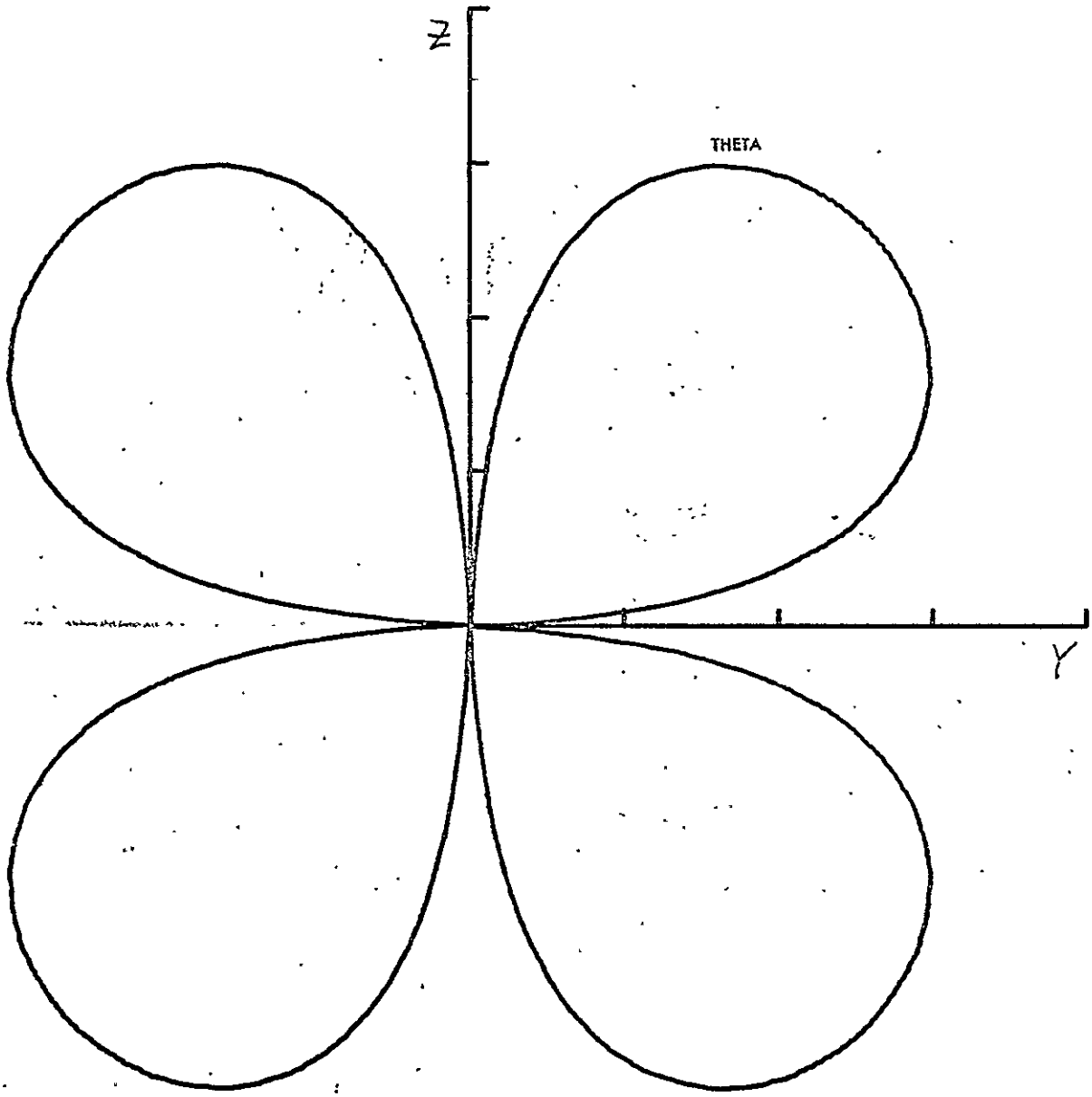

FIGURE F-12

FREQUENCY (MHZ) 9.18
V-ANT. LENGTH (FT) ORTHO. DIPOLES
MODE UNBALANCED
DB MAX +4.4
DB MIN -15.6